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WRITTEN SO YOU CAN UNDERSTAND IT

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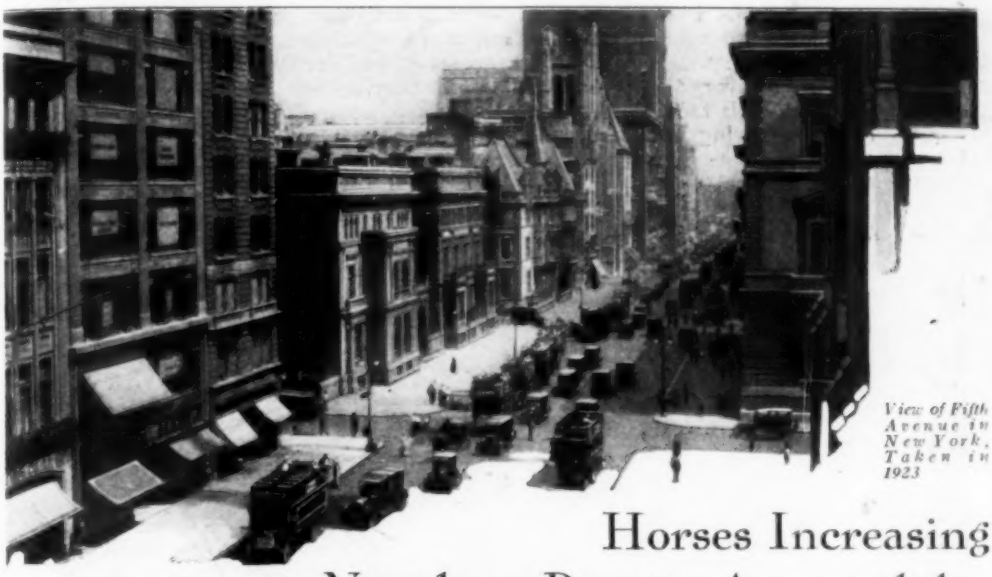


View of Fifth Avenue in New York, Taken in 1923

Horses Increasing in Numbers Despite Automobiles

WITH more than 13,000,000 automobiles now in use throughout the country, a recent census has shown that the horse, instead of becoming a museum curiosity, has increased greatly in numbers.

Better horses, and more of them, it is reported, are being bred now than at any time during the past quarter of a century, a gain in numbers of 2,750,000 being shown in the 25 years since motorized vehicles began to appear.

While more horses than ever before are being used on farms, they are gradually disappearing from city streets, many municipalities having laws forbidding their use on certain thoroughfares and in congested districts, in order to expedite the flow of traffic.

With the change, new problems in city planning have arisen. As the speed of transportation increases, square street corners are being changed to long, sweeping curves. It has been found by experience that the short turns slow up, while the long ones hasten, traffic. Fronts of buildings also have been cut away, the sidewalks being placed under the overhanging second stories to permit the widening of the streets.

Another problem has been the growing number of accidents. Approximately 14,000 persons were killed by motor cars last year, it is estimated. Based on figures, furnished by surveys of 60 cities with populations numbering 25,000 and over, during the past eight years, the following table has been prepared:

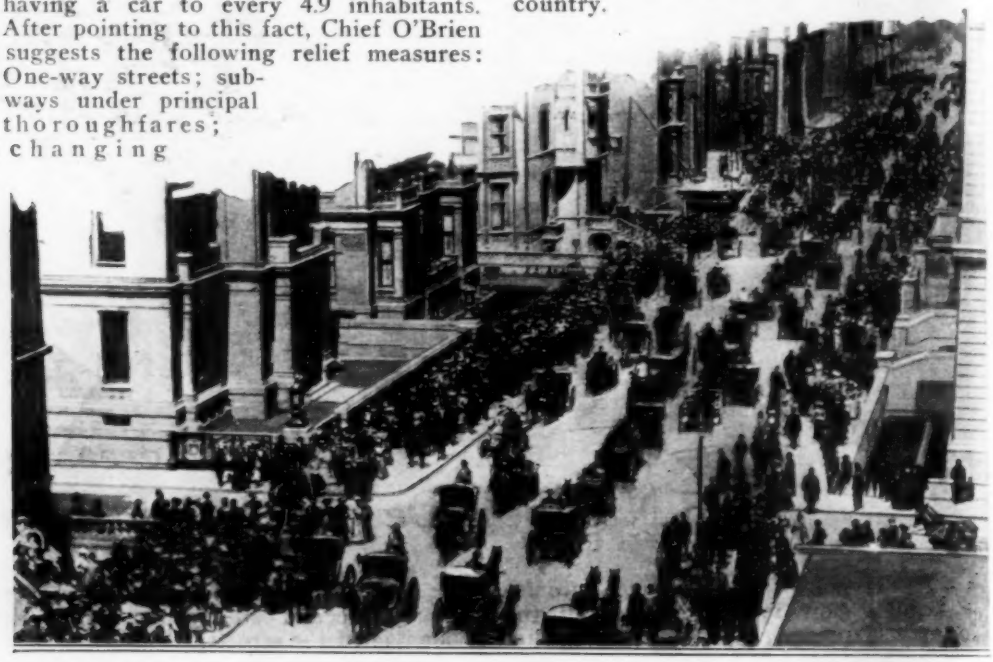
Year	Deaths per 10,000 Cars	Total Deaths
1915	24.0	5,800
1916	20.8	7,300
1917	18.2	9,000
1918	15.5	9,300
1919	13.0	9,700
1920	12.0	11,000
1921	11.9	12,500
1922	11.6	14,000

To meet these conditions, double-decked streets have been proposed in New York and Chicago. Subways and great underground parking spaces also are seen as a means to relieve the crowding. One-way streets already are in use in many cities with good results.

In a letter to Popular Mechanics Magazine, D. J. O'Brien, chief of police of San Francisco, says that the traffic problem must be met by opening up other avenues, as he declares, "we have reached a stage in our city life where it appears that regulations, from a police standpoint, are no longer effective to cope with the increasing automobile traffic."

California leads all other states in the number of its automobiles per capita, having a car to every 4.9 inhabitants. After pointing to this fact, Chief O'Brien suggests the following relief measures: One-way streets; subways under principal thoroughfares; changing streets paved with cobblestones to bituminous surfaces; reduction of the width of sidewalks to allow more space for vehicular traffic; establishment of new roadways, and the building of underground parking spaces beneath skyscrapers and in public parks and squares.

Similar plans have been advocated by other traffic experts and some of them already have been put into effect in several of the larger cities throughout the country.



Horse-Drawn Cabs Filling Thoroughfare in New York City in 1900 Before They were Crowded Off the Streets by the Growing Popularity of the Automobile

PECULIAR, MISSOURI, GOT ITS NAME IN PECULIAR FASHION

Connected with the naming of Peculiar, Mo., is a queer story. This small town decided that it had reached a stage where it was entitled to a place in the post-office directory, and its citizens suggested several names, all of which were rejected by postal authorities, as they had already been taken by other cities in the state. One official wrote "that it was very peculiar they could not find a name for their town." He received this reply: "Acting on your suggestion, we select the name of Peculiar." Thus, Peculiar was given its place in the postal guide book. Although the government does not name towns, it prohibits duplication within the borders of any one state. The same name, however, may occur in several states. For instance, there are 45 proper nouns used more than 20 times to designate cities and towns in the United States. There are 2 Chicagos, 6 Philadelphias, 7 Detroits, and 14 Denvers. In Pennsylvania, 13 communities begin with Green.

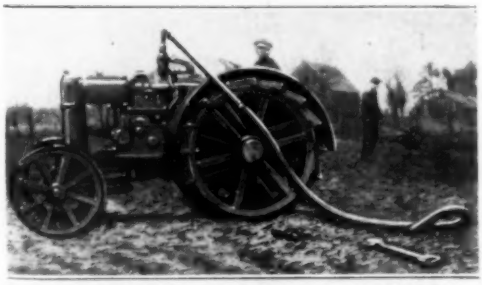
¶Typewriter keyboards arranged like that of the linotype machines have appeared on the market, to enable apprentices on slug-casting machines to finger the "board" more easily. This displaces the old-fashioned method of practicing on a paper chart. Publishers of small papers, who set their own type, can use this typewriter with greater ease on account of the duplicate keyboard.

BEES NOT SO BUSY DESPITE POEMS OF ENDLESS TOIL

Is the "busy bee" not so efficient as it is believed to be? Experiments by government experts now indicate that stories of the ceaseless toil of the honey gatherers have been due more to the number of bees than to individual effort. By means of a very delicate apparatus and quick-drying paints of many colors, they made a check of the insects' activities and found that each worker makes on the average of five or six trips a day to the fields. The length of these depends upon the plenteousness of pollen and nectar, ranging upward from 15 minutes. After a bee deposits his load, he enters his cell and remains at rest for a half an hour or so, before taking to the wing again. His actual work is performed in about a half day, while the remainder of the 24 hours is his rest period. While apparently disproving the accepted idea of the insects' capacities for work, the investigators also learned that the harder bees labor, the shorter their lives. Some, who seemed more industrious than others, died within three weeks, while those who moved slower lived as long as five months.

USES TRACTOR EXHAUST GAS TO KILL RODENT PESTS

Poisonous gases passing out of the exhaust of a tractor engine are used by a Wisconsin farmer to kill gophers, woodchucks, and other burrowing pests. A hose, attached to a piece of pipe, is inserted into one of the holes leading to the animal's home, after the other entrances have been plugged up with earth. The pipe is screwed to the exhaust outlet, and the engine started. The deadly fumes filling the underground chamber, smother the rodents in a short time.



Piping Deadly Exhaust Gas from Tractor Motor to Underground Home of Rodent Pest

FIRE LADDER FOLDS INTO POLE, SERVES AS BATTERING RAM

Armed at the ends with steel ferrules, a fire ladder that folds up to resemble a pole, can be used as a battering ram. Built of strong, light wood, and occupying no more space than the ordinary pike, it may be easily carried through small windows and narrow passageways by one man. Only a few seconds are required to open or close it, an automatic lock preventing its collapse while in use.

Fighting Fire from Folding Ladder that Can Be Opened in a Few Seconds: Left, Ladder Collapsed into Pole

SILKY TISSUE, CLEAR AS GLASS, IS PROOF AGAINST ACID

By a secret process, a product as flexible as silk and as transparent as glass has been developed. This discovery, coming after years of experimentation, is said to open a new field in the paper industry. Manufactured in various thicknesses, it can be wound in rolls so consumers can cut it into desired lengths. Acid, alkali, or oxidizing agents of ordinary concentration do not affect it, and it burns less readily than other paper.

DEPOTS ON WHEELS ARE MOVED BY LOCOMOTIVES

Railroad Station from Abandoned Town Being Transported to New Location, Where It Will Remain until Another Shift of Population may Cause It to be Moved Again

In a sparsely settled section of the country, where populations of small towns find it necessary to change locations from time to time, because of various conditions, a railroad has adopted the novel plan of moving its stations. Instead of putting up others, where towns spring up almost overnight, they load stations of some deserted villages onto flat cars and transport them to the new communities.

LID HOLDER PROTECTS HANDS FROM SCALDING STEAM

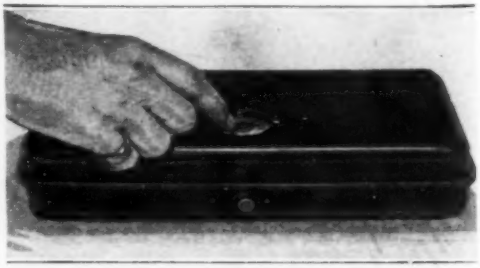
To protect the housewife's hands from scalding or burning, a kettle lid holder has been invented. Slots riveted to the upper rim of the kettle hold the lid firmly in place when the utensil is tilted to drain hot water from vegetables or meat, thus preventing the escape of burning steam. The cover slides easily in and out of the holder and permits more freedom of manipulation without possible injury than the old-style pot.

BELLS OF CHIMES ARE TUNED BY CUTTING IN A LATHE

By turning bells in a lathe, their proper tone can be restored. To lower the tone, the bell tuner reams it out from the point at which the swell begins, nearly down to the rim, frequently testing it with a tuning fork. The moment the proper pitch is produced he stops his work. In raising the tone, he shaves off the lower side, shortening the bell, for of two of equal diameter and thickness, the shorter will give the higher note. A notable instance of bell tuning occurred at Lausanne, where twelve bells, in three neighboring church steeples, had only seven notes, and caused a curious discord.

KEYLESS TOOL BOX FOR AUTO HAS COMBINATION LOCK

As a safe repository for automobile tools, a keyless box that is opened by a simple combination lock has been marketed. It is intended for use by owners who keep their cars in public places. The receptacle, made of heavy material, is large enough to hold a complete repair kit, yet is so compact that it may be placed out of the way under the cushions or in the running-board container. There is no key to be lost or misplaced.



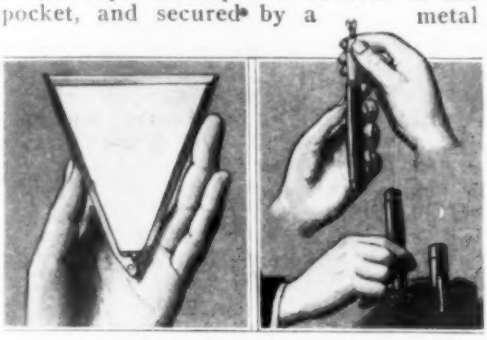
Keyless Automobile Tool Box with Combination Lock Prevents Careless Borrowing in Public Garages

EARTH'S AGE IS "SET" AT TWO OR THREE BILLION YEARS

After long investigation, scientists have announced that the earth has been in about its present state for two or three billion years. Geological measurements previously made were all lost in a maze of time before they had traced the history of the planet beyond 100,000,000 years. The present discovery rests on the rate by which radioactive substances change form. These materials are not permanent, but in time turn into lead.

POCKET CUP FOLDS IN TUBE SIZE OF FOUNTAIN PEN

Sanitary, compact, and easily carried, a patented drinking cup made of waterproof fabric on a thin wire frame folds into a tube the size of a fountain pen. It is specially designed for travelers and persons who live in states where individual cups are required. Placed in the pocket, and secured by a metal



At Left: Tube Drinking Cup Opened. At Right: Closed and Placed in Vest Pocket

clip on the top of the tube, it takes no more space than a pencil. The two-piece container keeps the cup clean.

DISCOVERY OF AMERICA COST SEVEN THOUSAND DOLLARS

After a searching inquiry, it has been estimated that it cost $7,250 for Christopher Columbus to discover America. The explorer was paid about $320. Luis Santangel, a nobleman, and not Queen Isabella, of Spain, provided most of the money to outfit the three ships and pay the sailors, who were seeking a new route to Asia, says the investigator. The Pinzons, who commanded two of the ships, were paid $130 each, and a common seaman got $29 for the voyage.

"SILENT MINISTER" ON STREET BROADCASTS DAILY SERMON

As a supplement to his regular Sunday sermons, an eastern pastor has erected on the principal street intersection of his city, a structure termed the "silent

"Silent Preacher" at Busy Street Intersection, Giving Out Its Daily Sermon to Hurrying Crowds

preacher," which gives daily scripture lessons to passers-by. The building is a small, glass-inclosed kiosk, containing a Bible and fresh-cut flowers to catch the eyes of pedestrians. Each day the Bible is opened to a new page. Protected from the wind and weather, it broadcasts its message to passers-by without interruption. In this way the minister reaches more persons than would be possible through his Sunday services alone.

INDIAN GEMS LIKE JEWELRY FADS OF PRESENT DAY

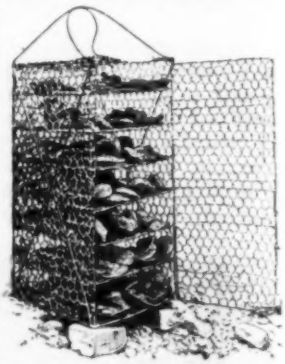
Relics of the early American aborigines, resembling the "novelty jewelry" of today, have been found in excavations now in Progress at Burton Mound, Santa Barbara, California. Among the adornments unearthed are hairpins of bone tipped with asphaltum and studded with tiny crystals; gems of abalone shell; pendants and similar decorations, said to be unlike anything ever before found on the continent. The tribes that made them are thought to have been highly skilled in the art of carving ornaments.

JEWELS OF ROMANCE IN FAR JAPAN

Report No. 170 from Popular Mechanics Magazine's Japanese Correspondent,

N. SAKATA OF TOKYO

I herewith wish to explain something of the cultured pearl which is only made in this country, except few other places in the world. There may be some who does not know name of the Mr. Mikimoto, a noted maker of the cultivated pearl in this country, but there must not be such persons in your and especially in European land. In England and France, you cannot pick out of people a man who does not know name of Mikimoto. To such a extent, name of him is known. Mr. Mikimoto, when I met him yesterday in his shop at Ginza, Tokyo, told the following story.



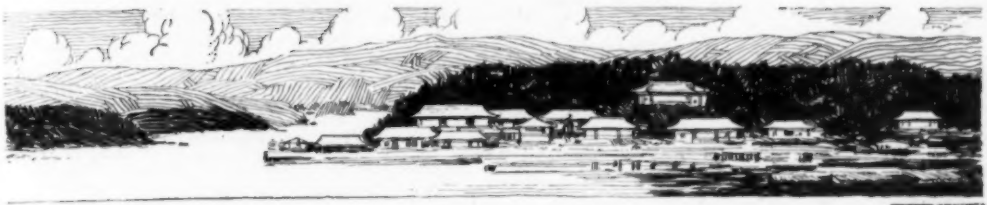
Oyster Basket or Cage

He once was a owner of the small tea-house near the beach of Yise-Bay where is numbers of pearls are being cultivated. That was about 30 or 40 years ago. From such time a youth who became a noted business man in the world, was trying to find out a field where he could find his true success.

The said Yise-Bay has very beautiful range of scene and inasmuch as that bay is sarounded by three land, with only one outlet to the outer ocean, consequently there is not comparratively wild waves. Calm sea with beautiful landscape attracts very many city people for their trip or one day pleasure. One day a gentleman who has returned from the foreign country after deep investigations of the culturing of the pearl, came there and stopped his pleasure at Mr. Mikimoto's small tea-house. That is the first chance on which Mr. Mikimoto and the gentleman made a touch. Since that time, both of them became intimate for friendship, though one of them is a noted gentleman and other is a mere owner of the poor tea-house.

From that time, that gentleman paid major part of his life in investigation of the pearl cultivating and stepped to such a extent that more one year or half investigation would be enough for producing the perfect true circle pearls. At this time Mr. Mikimoto was a best assistant for the gentleman. He closed his poor tea-house and aided the gentleman as if he was a hand or leg of the gentleman. Mr. Mikimoto had no other intention except he wished the gentleman could make out true circle pearls. About two months after, the gentleman got ill, though it

Inserting Glass into the Oysters



was very slight one, and put him on the bed, from which he directed Mr. Mikimoto.

The ill which considered to be slight one became very serious and after only one month sick, he went to the heaven, leaving very precious material, in Mr. Mikimoto's hand, which would be changed into enormous amount of wealth. Consequently Mr. Mikimoto had to continue the left enterprise of pearl cultivating. Since he worked and worked, from dawn to fall, in investigations and labour.

Sometime he immerged in the water for several hours in handling the pearl oyster. His story continues to the interesting part, while my keen interest grow. He presented me a coffee and I accepted it with thanks.

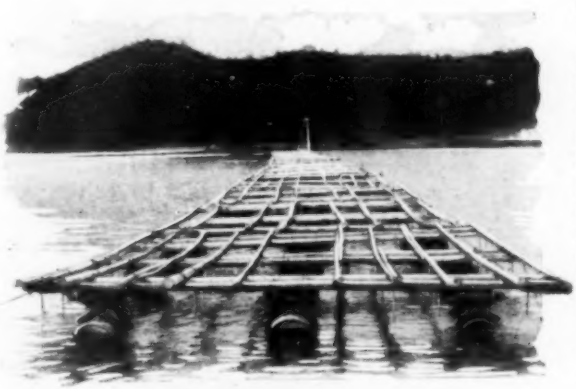
He continued. It is by no means easy task, working in the water in coldest season in the year though he had set such a thing as cold, or poverty at nought. Yet he sometime determined to give up the enterprise, but he could never give up the job if he thought of the died gentleman to whom he debited very much.

After three or four years after the gentleman died, he first picked up the bascket from the water. That was the first time on which he picked up the bascket in which many oysters were put. In the oyster a glass ball was put on which oyster will cover with it's flesh. If oyster cover the glass ball in true circle, that is success. But when Mr. Mikimoto picked out them, he found that his efforts was in vain. Such effort which spent in vain continued several times. He after ten days deleverations, he thought it would be better shut up his enterprise and commence again his poor tea-house. And he stepped to ending the enterprise.

One day when he picked up, expecting again fault work, the bascket, he found that his effort was not in vain. He wondered whether it was true or a mere dream. But it was not dream but a real success. He thanked and thanked to God for success. This was the first time he could get true circle pearl, and found a key to success.

Mr. Mikimoto gazed at me with passionate eyes and told me that he could not write down or speak how he was glad at a true circle pearl.

You may not know how a cultivated pearl is being made. I will tell you, as it is very simple to do. If you can get blessed place from our God, your success is on your foot. How Mr. Mikimoto succeeded is due to the fact that he is blessed by the God.



Frame from Which Cages are Hung

First make a glass ball about 1/8" diameter and insert it in the body of the oyster and immerge that oyster in the water about from one to five years, depending upon the desired size of pearl. During that period, as oyster itself can not bear the pain, will cover that glass ball with his own flesh. In this five or so period, special handling should be paid and according to degree of

carefulness of handling, success or failure is determined.

The pearls made by Mr. Mikimoto's shop have fixed value or estimation among the world's jewellers. You cannot by any way or test determine wether it is natured pearl or cultivated pearl. Many severe test were made in finding whether it is cultivated one or not, but such all attempt ended in vain.

On front of me there are shown very many kind of jewels and Mr. Mikimoto showed me one of pearl and explained. He also showed me one of natural pearl and asked me could I distinguish both of them. You had better go home jewel store in your city and ask them to show you both Japanese cultivated pearl and natural pearl. That test will convince you better than I try explain you here.

Of famousness of Mr. Mikimoto, I must put women diver in my consideration. Mr. Mikimoto told that that is only his place where women divers are employed. Beginning stage of his enterprise he immerged his bascket containing oyster on the bed of the sea water, so, in taking it up again, he had to use divers. He found that women in the territory are suitable for the diving work. But increasing wage and defficult to gather the women diver caused him to use other method which will overcome the above defficulties.

So he constructed a frame work and hanged very many basckets from the wood frame by the steel wire to about two feet depth from the sea bed. This will go into about twenty or 30 feet in the water. This story must be very interesting one of your readers, especially women and I hope you accept my labour paid for this.

This Mr. Mikimoto's pearl is not imitated one to natural pearl as "Roman Pearl" or "Venetian" pearl."

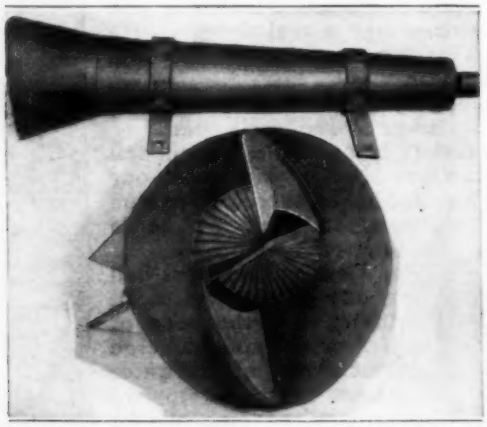
Hopping to be favoured with your prompt answer.

Yours Very Truly,

K. Sakato

AIR SCRUBBER BARS DUST FROM AUTO ENGINES

Entrance of dust into a gasoline engine is claimed to be prevented by a recently invented attachment that clears the air before it reaches the carburetor. As the air passes through a spiral channel, it is rotated at great speed, the gritty matter being thrown outward and held by the walls of the tube, instead of being carried into the motor, where it forms carbon, and grinds down pistons and cylinders.



Rotating Air at Great Speed, This Device Prevents Dust from Entering Automobile Engines

HOW TO TIME PHOTOS IS TOLD BY EXPOSURE METER DOT

By uncovering a piece of sensitized paper on a camera meter, recently patented, the photographer can tell at a glance how long to time his exposure. If the paper has darkened in four seconds, a snapshot would be wasting the film. For comparison, a normal tint appears on the meter dial, eliminating much of the guesswork of amateur camera owners. The idea has been adapted for use with various lenses, speeds, and conditions of light. When the meter shows the light to be too weak for a snapshot, the length of time exposure is indicated. Disks of photo paper may be replaced at small cost.

¶In the country east of the great plains and north of Maryland, a little more than a pair of birds is the average to an acre of farm land as shown by a recent survey.

SCIENCE ANSWERS CRY FOR GREATER SPEED

Every Sort of Vehicle from an Electric Lawn Mower to a Small "Tank," and Others Including Motorcycles and a Truck Drawn by a Baby Elephant, Shown in the South Recently

Land transportation had its origin in the prehistoric age, according to scientists. First, the woman was the burden carrier, and, to make her more efficient, trails were created through forests and across plains. These marked the course of the future highways of civilization.

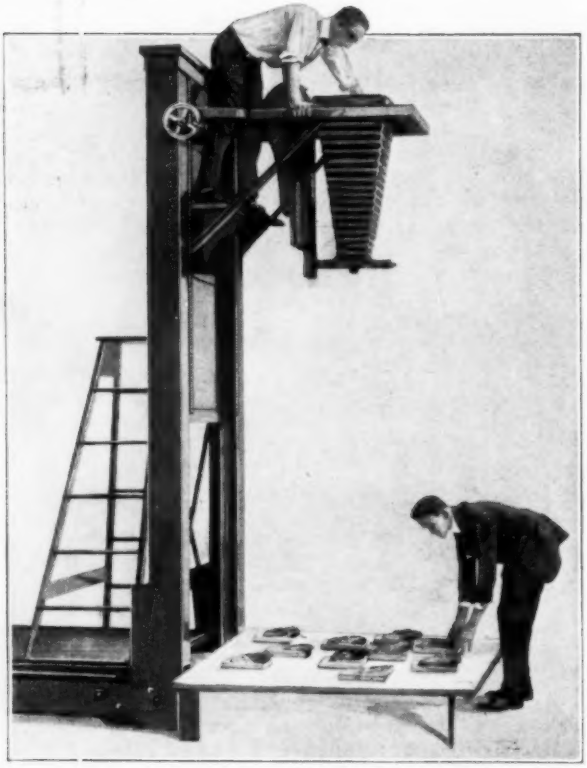
Just when primitive man transferred the load to the back of an animal is a matter of conjecture, but the change was final, and the first step in solving the problem of land carriage. Next came the roughly hewn plank, drawn by a beast. This was transformed into a sled. Then came rollers, wheels, the cart, and, finally, four-wheeled vehicles. These served until the seventeenth century, when the necessity for increasing capacity led to the adoption of wooden rails over which coal, in England, was hauled to river and sea for supplying boats.

With the use of steam, a new era of progress set in that has almost annihilated distance. Gas engines brought the motor car and tractor, and made the airplane possible. Answering the ceaseless cry for more speed, every device known to science has been applied to transportation problems, resulting in the saving of time and increase in human efficiency.

SHRINE OF STONE AGE YIELDS MANY HEATHEN RELICS

Relics, estimated to be about 4,000 years old, have been found by scientists in a tomb and shrine of heathen worship built during the Stone Age. Located in the southern part of Sweden, it lay buried beneath ten different strata of earth. Constructed of large rock slabs, it has a central chamber, 10 by 5 feet. Around this is a circular pavement, from which radiate a number of curious walks marked by stones. A considerable quantity of human and animal bones, together with flint daggers and spearheads, were unearthed. Also, there were about 7,000 fragments of ornamented vases, which had been thickly strewn outside the tomb. The shattering of these containers probably took place in connection with heathen religious ceremonies.

BIG CAMERA IN AIR "SHOOTS" TOWARD FLOOR



Operating Camera on Platform That Moves in Frame to Make Pictures of Large Displays Below

For making photographs of large displays that cannot be mounted on an upright wall, a Middle Western man uses a large camera that slides up and down in a frame 18 feet high, and focuses on a big table below, on which objects are placed for reproduction. The operator climbs a stepladder to the platform under the camera, which he moves by turning wheels. A white background is provided by lights under the "ground" glass. Two big lamps placed at the sides bring out detail in the display. Photographs to replace blueprints, and pictures of sample exhibits for salesmen, are made with this equipment.

"CATERPILLARS" HELP TO TILL WESTERN PEAT LANDS

By the use of "caterpillar" tractors, peat lands of Minnesota, long regarded as unfit for any kind of cultivation, are being reclaimed. Because of the soil's looseness, it is almost impossible to work in these sections with plows drawn by horses.

"DEAD-AIR" SPACE IN COOKER PREVENTS FOOD BURNING

To prevent food from burning, a pan with a double bottom has been made which may be used for frying, roasting, self-basting, or steam cooking. The outside is of steel and the inner part of aluminum, with a "dead-air" space at the bottom, which eliminates the possibility of a scorched dinner without the usual watching. When the roast is partly done, the sidewall and cover can be easily removed to allow it to be turned over for browning both sides.

Combination Cooker with "Dead Air" Space at Bottom to Prevent Burning of Food

WHERE THE MEN ARE VEILED

While the women of the warlike, Tuareg tribe, residing on a mountainous plateau well within the great Sahara desert, go about with bared faces, custom forces the men to appear in public heavily veiled. Only a narrow slit is left for the eyes in the turban wrapped about their heads. The territory where these people live was almost unknown until 1850, when one of three explorers escaped death at the hands of the desert savages and returned to report his experiences. After a 30-year struggle with this tribe, the French government found it necessary to compromise, so relentlessly did these hooded warriors keep to the fray.

Does a Curse Fall Upon Those Who Touch Mummies and Idols of Mystic East?

Sinister Influences Attributed to Relics and Jewels That Are Believed to Result in Disaster and Ill-Fortune for Those Who Possess Them

WITH the completion of preparations for the reopening of the tomb of Tutankhamen, interest has revived in the curious superstition that a curse falls upon those who disturb the ancient dead of Egypt, bringing calamity to them and their families, even extending to their close friends.

The death of Lord Carnarvon soon after he had penetrated into the burial chamber, where the ancient ruler slept among all the splendors of his vanished empire and recent dispatches telling of the illness of the leader of an American expedition to "The Valley of the Kings," again has brought up the question:

"Is the curse of an Egyptian priest, invoked more than 3,000 years ago at the entombment of a king, operating over the centuries upon those who have disturbed his slumbers?"

Investigation shows that few authenticated cases of disaster following upon the disturbance of a mummy are so utterly bewildering as that of No. 22,542, which is the British Museum number for a certain relic of an Egyptian priestess of the temple of Ra, in the great city of Thebes.

According to Egyptologists, the priestess lived about 1600 B. C. The only remaining thing belonging to her is the lid of her coffin on which is painted in crude colors the face of the dead woman. The first heard of this sinister relic was its purchase by an Englishman from an Arab at Thebes. Before he reached Cairo, his gun exploded, and his arm was shattered. One week later he received word that he had lost the whole of his fortune, and shortly afterward, with the picture of the priestess in his possession, he died, poor and miserable. His companion passed away soon afterward.

Misfortunes followed hard upon the mummy relic, which then came into possession of a woman living in London. She lost health and seemed to be dogged by some malign and unaccountable influence. One day a famous Russian mystic visited her. Immediately she complained of a sinister presence. Before she left, she had seen the coffin lid.

"There is the evil influence which I felt on entering the house!" she exclaimed, and implored its owner to get rid of it as soon as possible.

The next owner sent the painted face to a photographer. Although it was just a piece of primitive art, partly destroyed by the ravages of time, the photograph is said to have shown a living face with an expression of intense hate.

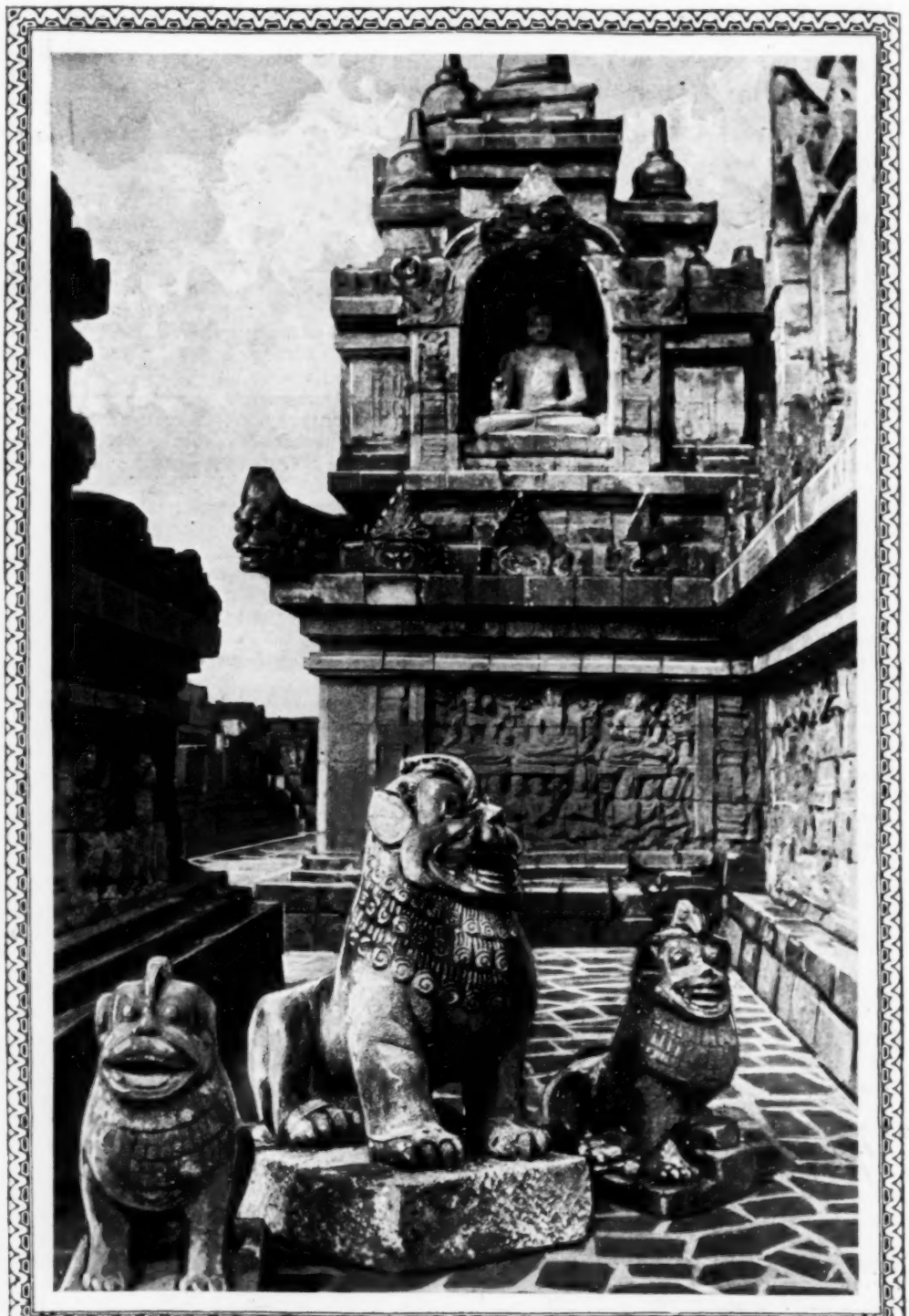
Those who hold that the explanation of such a history as this is an occult one, say that it was no less than a photograph of the spirit of the priestess.

However that may be, the last owner of No. 22,542 sent it to the British Museum where, it is only fair to say, the priestess has been behaving, and, while there are many stories of her evil doing since then, none of them are credited by the authorities.

Figure on Prow of Boat to Drive Off Evil Spirits of Sea and Protect Sailors

Somewhat similar stories are told about a figure of the Gautama Buddha which came into the hands of another London museum in 1911. This idol had been bought by a sea captain during a voyage to India. Before his ship reached England, it caught fire in a mysterious way. The crew, many of whom were Lascars, were afraid of the great teak figure, and insisted upon casting it overboard. Ultimately the vessel was towed into Liverpool, and some time later the Buddha was washed up off the coast of Wales, and claimed by the captain when he heard of it.

Following his death—which took place shortly after the recovery of the



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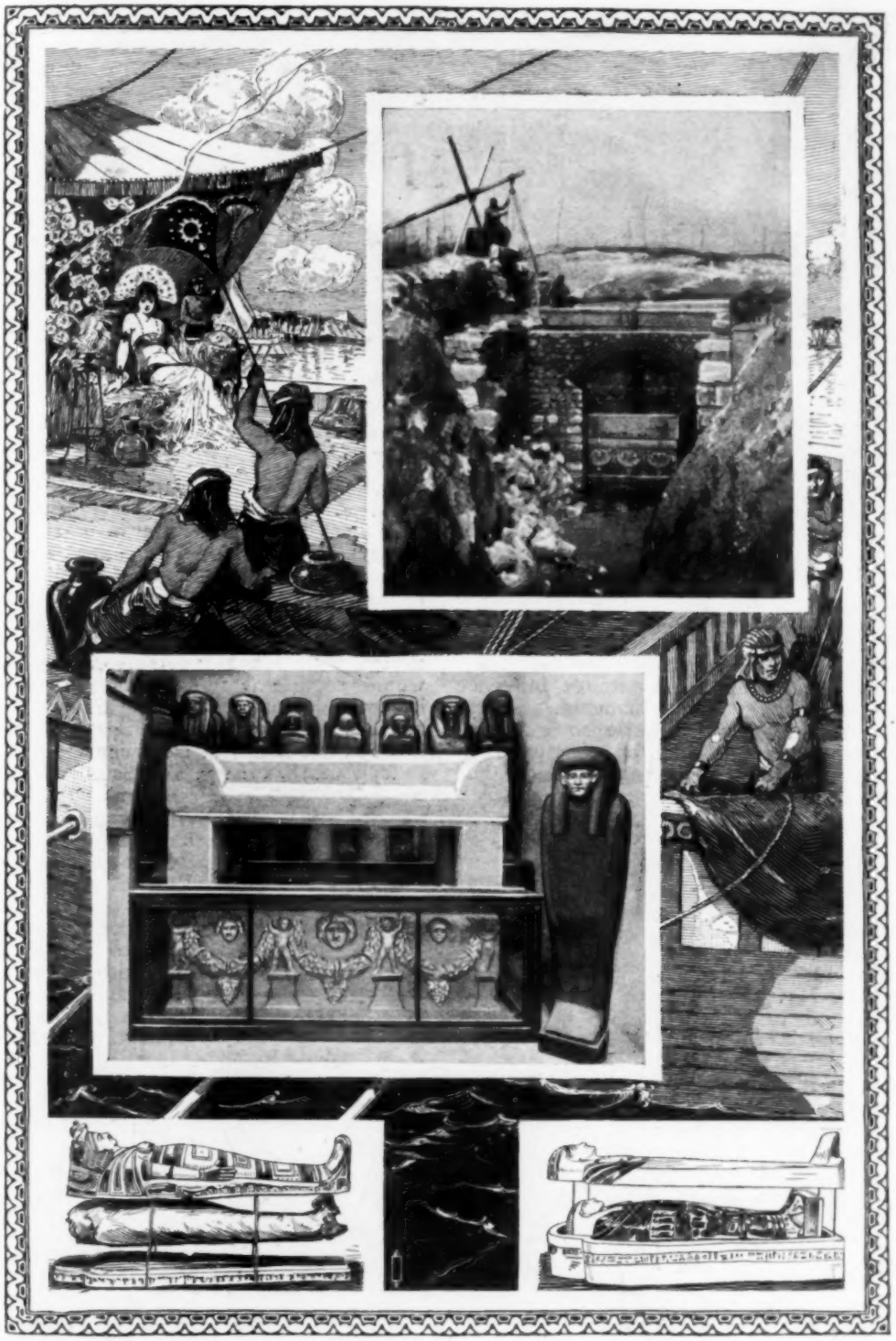
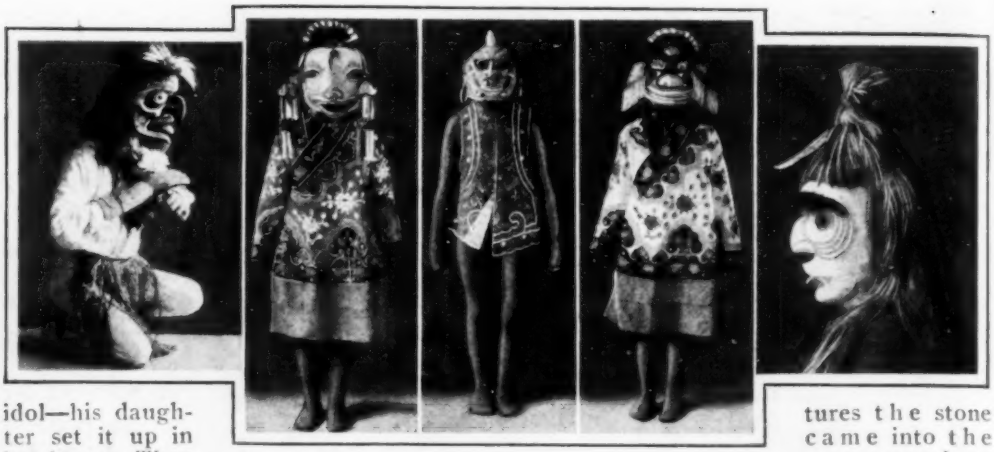
Mystic Figure of Buddha, Believed by Natives to be Protected by Ancient Curse That Brings Evil Fortune, Tragedy, and Death to Those Who have Sought to Remove It



Entrance to the Tomb of Cleopatra, and Mummies of Ancient Rulers, before Whose Frowns All Egypt Once Trembled: Their Remains Are Now Only Museum Relics



Grotesque Masks and Elaborate Costumes Worn by Devil Dancers in Asia to Terrorize Evil Spirits

idol—his daughter set it up in her house. Then began the trouble. The servants complained of it. One asserted that it moved, another that it frightened her. The children were scared by it, and said they dreamed horrible dreams in which the face of the Buddha peered at them. Visitors were frightened away, and so the figure was given to the museum, where it has remained under close observation without any peculiar manifestations.

Another story of a strange influence concerns the Hope diamond. Everywhere this gem has gone since it was stolen from the head of a figure in a Hindu temple, it is said to have left a trail of death and desolation. It was first brought to Europe by the French traveler, Tavernier, in the seventeenth century. Ruin overtook him in a few years. He sold the diamond to Louis XIV, of France, who gave it to his beautiful favorite, Mme. Montespan. She wore the stone, and quickly fell from royal favor.

Princess de Lambelle was the next victim to wear the jewel, and met death at the hands of a Paris mob during the days of the revolution. After many adventures the stone came into the possession of one Fals, a Frenchman, who, fearful of being accused of theft if he disposed of it, died of starvation.

In 1830, it fell under the ownership of Henry Thomas Hope, a collector, and then, after two generations of quiet, went to his grandson, Lord Francis Hope, who was the victim of many misfortunes.

So long is the list of tragedies connected with the Hope diamond that it would require a full volume to relate its entire history. From the time it was released by Lord Francis Hope, it passed through the hands of men who met with sudden death, lunacy, and bankruptcy.

It was owned by American millionaires, by French dealers, by the Russian Prince Kanitovski, by Abdul the Damned. To each it is credited with bringing death and disaster. Its last possessor was the wife of an American millionaire whose son was killed.

Mummy, sacred idol, precious stone stolen from some Oriental temple, what power do these inanimate things possess? Is there any real explanation of the tragic histories with which they are connected?

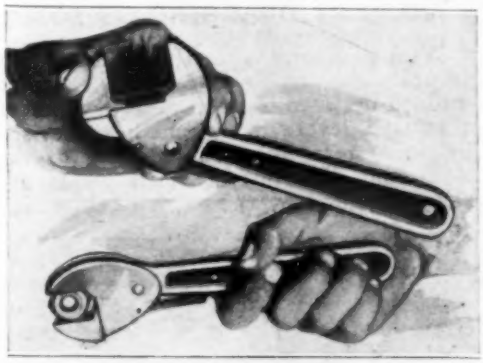
Alaskan Medicine Man Praying Before Totem Pole Carved and Painted with Symbols of His Tribe

BRIDES OF NILE IN OLD DAYS COST FOUR DOLLARS

Marriage contracts were in vogue among early Egyptians, according to tablets found in the Nile region by explorers. The earliest-known nuptial contract there dates from 590 B. C., the terms of which were drawn by the husband. It has been translated as follows: "Since God willeth that we should unite one with the other in righteous wedlock, after the manner of every free man and every wise woman, therefore I have given thee four dollars in gold as a bridal gift. And for my part I will not neglect thee. Neither shall I put thee forth without a cause, having legal ground. But should I wish to put thee forth, I will pay 17 dollars for the matter."

SPEED WRENCH CANNOT SLIP AND IS SELF-ADJUSTING

Taking a lightning grip upon any nut within its wide range, a recently patented wrench adjusts itself without a thumb



Jaws of Automatic Speed Wrench Extended and Gripping Nut for "Ratcheting"

screw, and the harder the pull, the tighter it holds. The mechanism for opening and closing the jaws allows it to be "ratcheted" rapidly, bolts being either loosened or tightened with surprising quickness. There is no possibility of the wrench slipping, or of working loose on the nut faces, and, as all parts are made of high-grade steel, it is practically impossible to bend the jaws. A spring aids in keeping its grip in constant adjustment.

¶So far as is known to scientists, no insect has a fatal bite although deaths have resulted from blood poisoning induced by scratching the irritations.

EVIL SPIRITS ARE CAST OUT BY BLOWING IN EARS

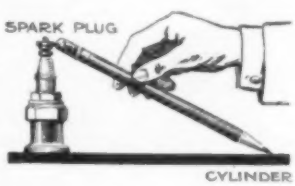
In Zululand, South Africa, native doctors collect fich fees by blowing into the ears of their patients to cast out evil

Native Doctor of South Africa Casting Out Evil Spirits by Blowing in Patient's Ear

spirits. The medicine man seats the victim on the blanketed floor of the outdoor surgery, after announcing that he is to dispel the wicked demons causing sickness. He places a horn to the patient's ear and blows. The ill one generally makes a bad face, cries "enough," and, being convinced that he has been cured, is troubled no more. In severe cases herbs are used as a remedy, when the horn is not effective.

LEAD PENCIL FOR SPARK-PLUG TESTING AIDS AUTOISTS

With a metal tip at the eraser end through which electric current passes, a pencil to test spark plugs has recently been placed on the market. Because the lead is insulated, it is a good conductor of electricity as it passes from the cylinder to the tip of plug. The test is made by touching the cylinder with the point, and the brass cap of the plug with the other end of the device.



¶In one year, it is estimated, smoke causes a damage of $500,000,000 to property in the United States.

SIX-POUND VACUUM CLEANER STRAPPED TO SHOULDER

So small that it is supported from the shoulder by straps, a vacuum cleaner, that weighs only 6 pounds, can be carried about without any discomfort, yet performs as many tasks as a larger instrument. For removing dirt and dust from crevices, where heavier tools cannot be manipulated, blower and suction attachments are provided, making it possible to clean inaccessible corners, telephone-switchboard equipment, motors, and radiators. It is also handy for drying hair after a shampoo.

Renovating Upholstering of an Automobile with Vacuum Cleaner That Straps to Shoulder

SPANISH MOSS BECOMES "HAIR" FOR STUFFING FURNITURE

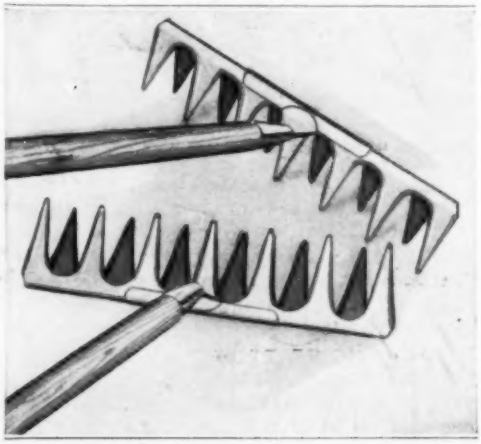
Spanish moss, that grows so abundantly on the hardwood trees in the swamps of southern Louisiana, has been found of value as stuffing for mattresses and furniture. Although not yet a staple on the market, the product is said to have a growing demand. Dry, resilient, and nonadhesive, it is especially serviceable for upholstering. Owing to its resemblance to coarse hair, certain grades of it are called "Spanish hair." Harvesting the moss requires little labor, since it falls from the trees when it ripens. Several methods are used to cure it for the market, the most popular being to pile it on the ground, wetting it, and allowing it to remain for three or four months, during which time it changes its color from green to black. Preparing the plant for dealers already has become a thriving industry.

TEN-DEGREE CHANGE IN SUN WOULD END ALL LIFE

Were the sun's heat to vary ten degrees, all life would perish from the earth, according to a scientist, who says that life here will continue indefinitely as it has existed for hundreds of millions of years. From the color of rays given off, the temperature at the sun is said to be about twice that of an electric arc. If the earth were a ball of ice, this solar heat would melt it in little more than 15 minutes.

TWO ROWS OF TEETH ON RAKE PREVENT DRAGGING OF SOIL

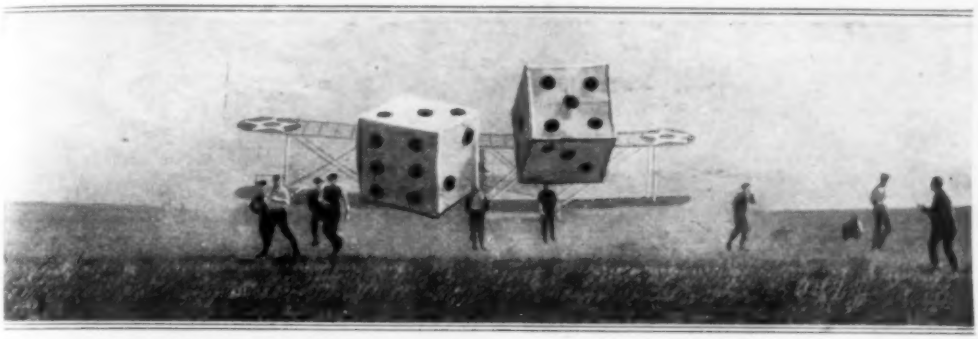
With two rows of teeth placed so that stones and rubbish cannot become wedged between them, a rake that makes a smooth, level surface, has been devised by an eastern inventor. Pulling of the loam and dragging of small plants are also prevented by the extra teeth, which are set behind, and between, the front ones. The prongs, all separated by an inch of space, thus permit the soil to pass freely through them.



Two Rows of Teeth that Prevent Stones and Rubbish from Clogging the Rake

ROLLING DICE BY AIRPLANE LATEST OF SPORTS

With giant dice made of light material, aviators now play the game of dice from their airplanes as one of the latest American sports. Placed in front of the machine, the propeller is twirled, and the rush of air sends the dice rolling down the field with the plane in pursuit. The cubes are then placed in position again.



Playing the Game of Dice by Airplane: Huge Cubes of Light Weight are Rolled down the Field by a Blast of Air from the Machine's Spinning Propeller

HUSBAND DOES COOKING, WIFE HUNTING, IN AFRICA

Husbands are the cooks and wives the fishers and hunters in Barotse, a province of northern Africa. Though there is a well-organized modern government, the natives still observe some curious customs. It is no unusual sight to see a woman wading in a stream and carrying a big fish basket. When she returns home, the husband does the cooking. Then the wife sits down alone to dine, because, owing to his superior strength, a man might be tempted to take the choicest pieces before the woman gets her share. Another unwritten law is that when triplets are born, two of the babies must be killed for good luck.

"GAT" SHOOTS OIL INTO AUTO UNDER HIGH PRESSURE

Shaped like a pistol, a device is being marketed that is designed to make the oiling of an automobile chassis a clean

Oiling an Automobile Chassis Made an Easy and Clean Task by Oil "Gat"

and easy job. With its 16-inch long barrel, the most inaccessible parts of the car may be handily reached. Operated with only one hand, the instrument shoots out the oil at a pressure sufficient to force it into tiny crevices. It may be refilled by removing a cap at the big end.

CHRISTMAS TREE KEPT FRESH BY WATER IN HOLDER

By supplying moisture to the stem, a stand recently invented for Christmas trees keeps the branches fresh for a long time. Screws in the side of the holder can be set for any size, gripping the tree firmly after it has been pushed down to reach water in the basin. Filling is done through an opening covered by a threaded cap.

¶To hasten the handling of large amounts of cotton from the Orient passing through San Francisco for further shipment eastward, a fumigating plant is to be built at that port. It will be so located that moving of goods will be made with the least possible delay.

When Banditry and Mechanics Conspired

How a Homemade Cannon Served the Purpose of an "Excellency" of Old Mexico

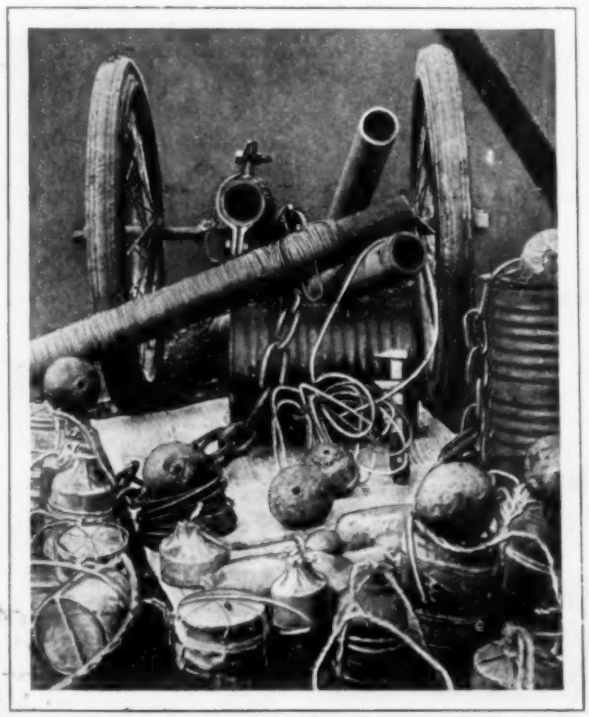
BY SIDNEY McNEILL SUTHERLAND

[This is the first of a series of articles by Mr. Sutherland, relating his experiences in the land of the Mexican bandit. Particularly capable of portraying the native character and its fascinating background, his stories will be found frequently amusing, often strange, sometimes thrilling, and always interesting and informative. Mr. Sutherland has had rare opportunities to become acquainted with our neighbors below the Rio Grande. Born in Monterey, Nuevo León, on April 13, 1888, the son of an American missionary and his wife traveling in Mexico, Mr. Sutherland learned Spanish in infancy. Altogether he lived in Mexico and other Latin-American lands more than fifteen years. Later, his knowledge of the country, the language, and the people, led to his employ at various times as a newspaper war correspondent in the many revolutions which have ravished that great country.—Editor.]

IN January of 1912, I occupied the dual rôle of news editor of a Mexican newspaper, and special correspondent of a New York daily. For the latter I made many trips into the states of Puebla, Tlaxcala, Guerrero, Hidalgo, Oaxaca, and Morelos, where scores of rebel leaders were indulging in Mexico's favorite outdoor sport—uprising.

The best "copy" for American readers, aside from incidents affecting American citizens, was furnished by the Zapata brothers, Emiliano and Eufemio, whose bands often raided the incredibly rich sugar, coffee, and tobacco plantations of Morelos. There is an "inside" story connected with the Zapatista forays against the Castillians, which has never seen print in this country, and which helps explain the strangely successful career of the Zapatistas.

Gustavo Madero, brother of the president, was a grafter whose sagacity, resourcefulness, and utter shamelessness would arouse the envy of the most conscienceless politician. To Gustavo and his coterie of knaves may be attributed the Felix Diaz revolt and the ensuing collapse of that country. A "chance" bullet fired in front of the Felicista headquarters at dawn of Feb. 20, 1913, ended Gustavo's buccaneering exploits.



The Famous Cannon Mr. Sutherland Made for Eufemio Zapata: The Tragedy-Comedy That Followed the Attempt to Fire It is Described in the Accompanying Narrative

Now, Emiliano Zapata and his followers might steal commissary stocks, steers, horses, saddles, and clothing; and he might ravage the cane crops, burn tobacco barns, and destroy coffee mills and residences, but he could obtain scant quantities of the two articles indispensable to Mexican banditry—arms and money. The latter had been transferred by the Spaniards to Mexico City, and the former were kept out of Morelos. Emiliano confined his activities to the state of Morelos; but Eufemio and his cutthroats sometimes wandered farther afield.

"Zapata . . . . . yelled with laughter . . . . . 'dios de mi vida!' he gasped, wiping his eyes."

About the middle of January, a reporter from the Mexican newspaper succeeded in interviewing Emiliano in his mountain lair—no insignificant feat—and on his return told me he had heard that Eufemio was preparing to plunder an American mining camp in Guerrero sometime before February 1. I at once proceeded overland into the Sierra Madre range on horseback, after leaving the train at Iguala, and reached the camp of the brigands three days later about dusk.

After responding as warily as I could to the outer sentry, who challenged me at the foot of the mountain, I was blindfolded and conducted to Eufemio. Proing in keeping his men armed. Not strong enough to attack a garrison, he didn't know what he was going to do for carbines and ammunition.

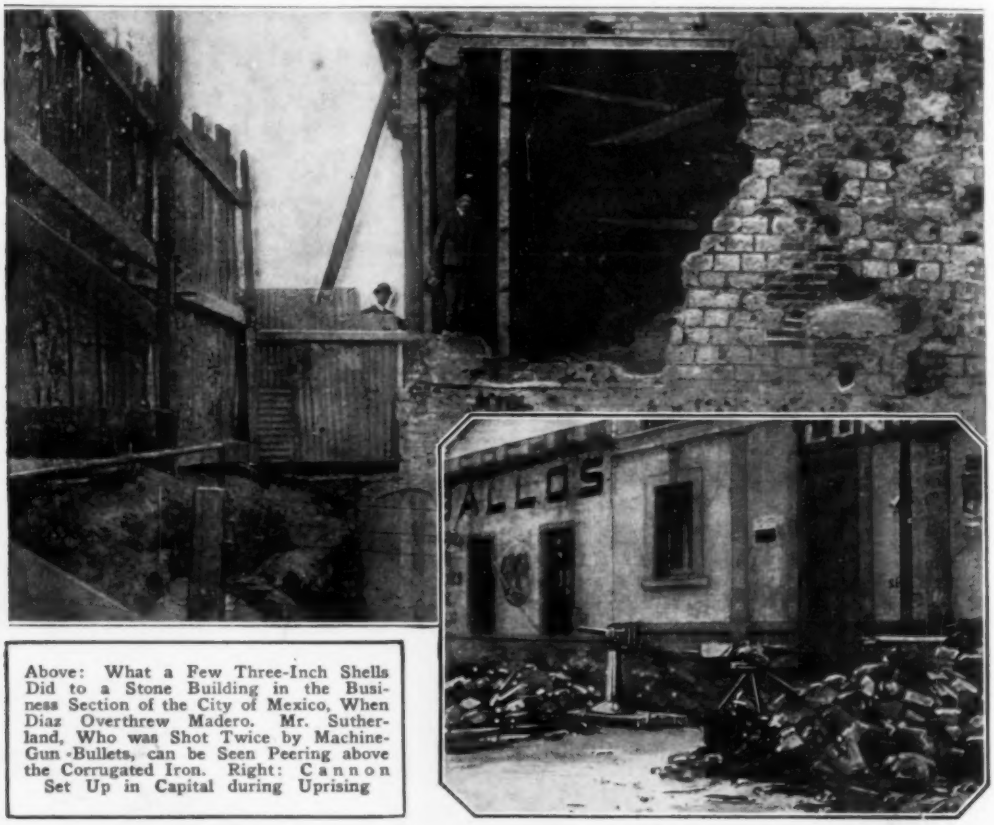
"If I only had a machine gun, or a cannon, or some bombs," he said, "I could surprise a cuartel and supply my valiant soldiers."

A whimsical thought came to me.

"I can't get you a machine gun," I told him. "But I can make you a cannon and all the bombs you want."

"What!" he exclaimed. "You can? O, señor, if you would do that I would—I would do anything you might ask."

"Anything?"



Above: What a Few Three-Inch Shells Did to a Stone Building in the Business Section of the City of Mexico, When Diaz Overthrew Madero. Mr. Sutherland, Who was Shot Twice by Machine-Gun Bullets, can be Seen Peering above the Corrugated Iron. Right: Cannon Set Up in Capital during Uprising

longed and searching questions finally persuaded him that, although a gringo, I had only a newspaperman's interest in the forthcoming raid. He assured me that my "paisanos" (countrymen) would not be injured, but that he intended to take anything and everything he could carry away.

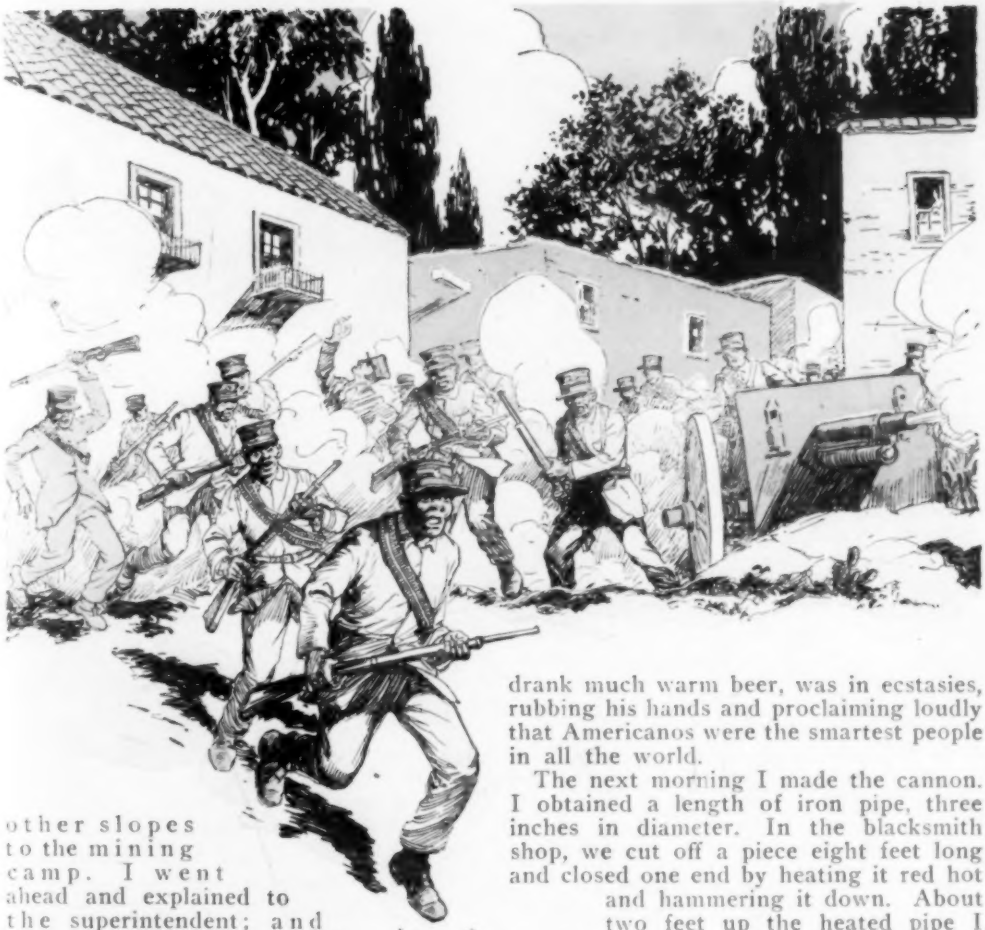
After we had eaten a modest supper of beans, goat meat, and tortillas, Eufemio complained of the difficulty he was having

"Anything. Si señor, if you will make a cannon for me I'll agree to do anything. Have you an enemy you would like to have—disposed of permanently?"

"No, thank you," I laughed. "But if you will not molest the gringo mining camp, I'll make the weapons you need."

"Agreed!" he replied.

The next morning, accompanied by twenty ruffians, we rode down the mountain, crossed the valley and ascended the



other slopes to the mining camp. I went ahead and explained to the superintendent; and then fired a shot to notify Eufemio to come on. The Americans effusively welcomed the outlaws, who, not to be surpassed in politeness, swept the ground with their sombreros, embraced the señor Americanos, and kissed the hands of the reluctant ladies.

After luncheon, I made the bombs. They consisted of Vienna-sausage tins, tomato cans, and heavy stone jugs filled with black powder and bits of dynamite, of which the Americans had a large stock, and buckshot, bolts, nuts, and broken glass. A small piece of woolen underwear was torn and twisted into fuses, and lengths of rope were looped about the "bombs," furnishing at once a means of carrying the things and a sort of "slingshot" so that they could be lighted, swung rapidly about the head, and thrown 50 yards or so.

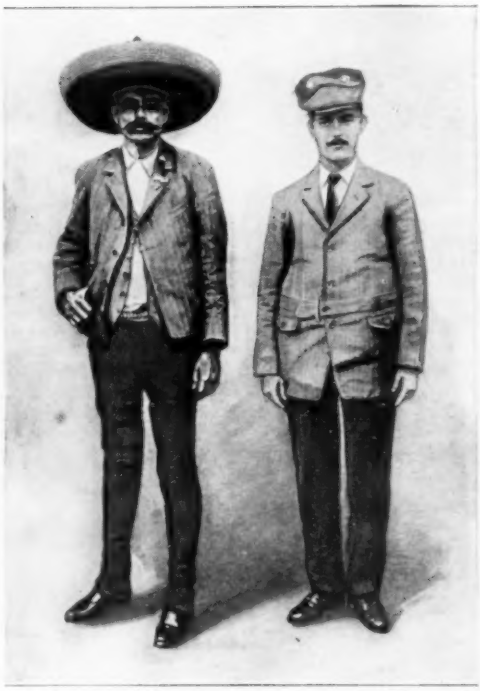
I hadn't the remotest idea whether they would explode; but Eufemio, who had drank much warm beer, was in ecstasies, rubbing his hands and proclaiming loudly that Americanos were the smartest people in all the world.

The next morning I made the cannon. I obtained a length of iron pipe, three inches in diameter. In the blacksmith shop, we cut off a piece eight feet long and closed one end by heating it red hot and hammering it down. About two feet up the heated pipe I drove in a ten-penny nail, leaving a hole for the fuse. Back of the farrier's shop was a dilapi-

dated, homemade buckboard which had formerly run on two discarded, wire-spoked motorcycle wheels. I took these wheels, made an axle of a three-foot piece of iron; nailed the cannon to a heavy board, and bolted the board to the axle.

"There's your cannon, general," I said to Eufemio, who had hovered about me all morning.

"Wonderful! Superb!" he exclaimed. "Now, indeed, the forces of liberty and justice shall rout the tyrant's armies, and righteousness prevail throughout our glorious country."



Left: Eufemio Zapata. Right: Mr. Sutherland

He picked up the rope "traces" and stalked to and fro, pulling the contrivance after him, the end of the plank bouncing over the rocks.

"Immediately following the siesta we shall fire a salvo to salute the new brigade," he announced. "Let us see, we must select a target for practice this afternoon."

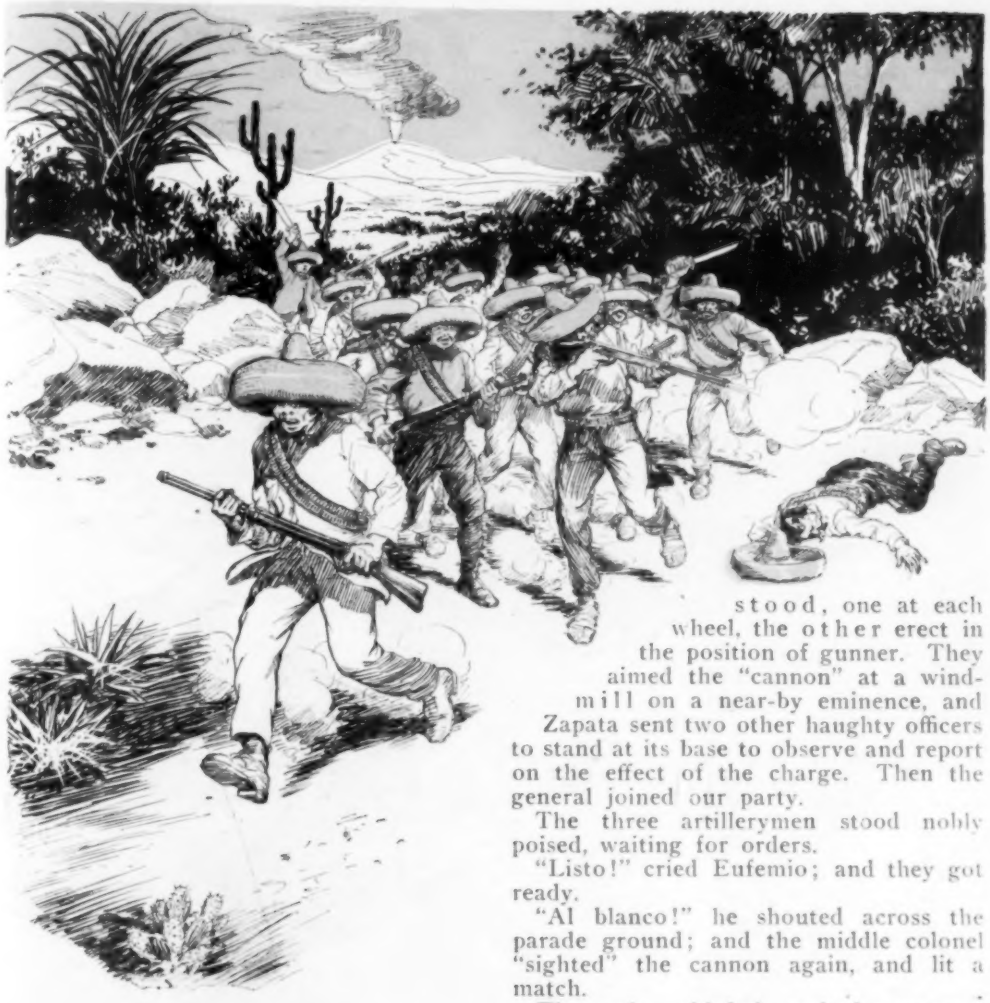
"I have it!" he continued, leaning close to me and whispering. "There are a couple of colonels and a major with me that I greatly distrust and dislike. They shall be placed a hundred yards away, and when they are not aware we shall accidentally fire in their direction! What say you?"

I said it would be all right with me.

"But, general," I added, "I am not sure how far this weapon will carry. If I had better materials and facilities, I could make you a real cannon. As a matter of fact, it may be more dangerous to fire this thing than to be fired at."

"Very well," rejoined the alcohol-mellowed patriot. "We'll have the colonels

What a Street Barricade Looks Like in the Ludicrous "Wars of Independence" Waged from Time to Time in Mexico



and the major shoot the cannon. I can find a couple of other members of my staff to use as targets."

The salute of honor was a solemn affair. The cannon was wheeled out into the yard, the rebels ordered to fall in—at a safe distance; and Eufemio, quite drunk, and I proceeded to load it. We poured black powder into the muzzle until for three feet the pipe was packed tight. Then we filled it nearly to the upper end with scrap iron, worn ball-bearings, and broken cogwheel teeth. I got a piece of cloth, rolled it into a short fuse, and thrust it into the nail hole.

While the Americans, the ladies, and I retreated to a doorway about a hundred yards away, Zapata commanded the two colonels and the major to advance. Proud of having been selected for the post of honor, they strutted forward and stood, one at each wheel, the other erect in the position of gunner. They aimed the "cannon" at a windmill on a near-by eminence, and Zapata sent two other haughty officers to stand at its base to observe and report on the effect of the charge. Then the general joined our party.

The three artillerymen stood nobly poised, waiting for orders.

"Listo!" cried Eufemio; and they got ready.

"Al blanco!" he shouted across the parade ground; and the middle colonel "sighted" the cannon again, and lit a match.

The outlaw chieftain waited a moment until he could control his mirth, the women clenching their hands and turning their faces. Then he cried:

"Fuego!"

The colonel leaned over, lit the fuse and cupped his hands about the tiny spark, blowing vigorously on it to keep it alive.

Suddenly, there was a terrific, splintering roar and a whirl of dust and leaves that completely obscured the spot. Above the cloud, we saw flying sombreros, sandals, a cartridge belt, and pieces of wheels and pipe.

When we reached the place we found a deep hole in the ground, a twisted wheel and three shattered bodies. Zapata threw his hat into the air and yelled with laughter, pounding the Americans on the backs, and kissing me heartily on both cheeks.

"Dios de mi vida!" he gasped, wiping his eyes. "Gringito, I ought to make you a general in my army. This is the most remarkable hour in my life. O, what exquisite comedy! Too bad my noble officers died; but thus it is, there must always be sacrifices in the development of science. Well, well! That was an excellent cannon you made, but I forgive you, amigo; and I shall live up to my pledge to spare this mine. I suppose your bombs will be as big a failure as the cannon. But never mind—I have other officers on my staff who shall become bomb throwers in our first battle!"

After effusive adieus the outlaws rode away, Eufemio's laughter echoing along the mountainside.

MODEL POWER BOAT SPEEDS SEVENTY MILES AN HOUR

Fashioned by hand, a model power boat, barely outside the realm of toys, has been made that attains a speed of 70 miles an hour for a brief period. With the same grace and smoothness of a 30-foot craft, it skims over the water by power generated by a tiny steam boiler, heated by a gasoline torch. Building these miniature speedsters has developed into a small industry. Racing them has become so popular that an eastern city has set apart a pond in one of its parks for that purpose.

VISITING CARD, RELIC OF OLD CUSTOM, PASSING OUT

Visiting cards, originated about 170 years ago when messages and names were scribbled on common playing cards and handed to a servant, are said to be passing out of use. This custom, which arose in Paris, became later to be considered crude, and was replaced by cards, engraved with pictures of landscapes, towers, and ruins, with space for written matter. The next development was to have the name printed on the card with some special design instead of writing it, one sculptor using a drawing of a rough-hewn block of marble. A nobleman of the 18th century displayed his name in the midst of an Egyptian picture of pyramids and sphinxes, while a duchess announced herself by a card bearing an illustration of a Chinaman with streaming pigtail, leaning over a fence, pointing to her name. Nowadays, the calling card is not so important as it was in the latter part of the last century, when each visitor to a person's home dropped a highly engraved pasteboard on a polished metal plate as a social requirement.

FOLDING CEILING FAN IS PART OF LIGHTING FIXTURE

Ceiling fan and lighting fixture are combined in a recent invention. When not in use, the four large blades of the fan fold away out of sight in the ornamental metal part from which the electric lights hang. Starting of the motor swings them out into position. The fan was made to save ceiling space and provide a comfort for home or place of business that is artistic, and that must not be moved twice yearly.

Electric-Light Fixture That Combines Ceiling Fan, Showing Blades Out and When Not in Use

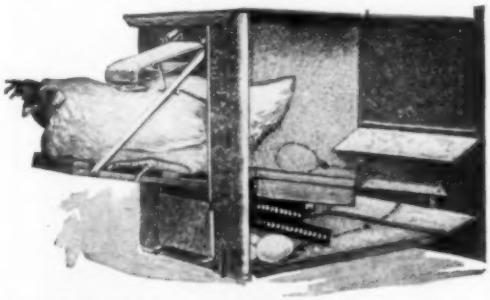
¶In the mines of India, 50,000 women are employed.

NONSINKABLE BATHING SUIT HAS POCKETS FOR AIR

Made of rubberized silk, a bathing suit made with air pockets so it will float a person in the water, has been patented by a middle-western man. Because the air pockets are not filled until the swimmer gets into water above the knees, the suit looks like any other when worn on the beach. Lowering of the skirt into the water fills the upper part of the suit with air that remains until the wearer leaves the water.

EGG COUNTER ON HEN'S BACK KEEPS LAYING RECORD

To make an individual record of the number of eggs each hen lays is the object of a recording nest patented by a middle-western man. The egg counter is carried on the hen's back, held firmly by leather straps fastened around the wings. Every time she leaves the nest, after laying, an egg rolls against a setting flap,



Nest That Makes Separate Record of Eggs Laid: The Counter is Worn on Hen's Back

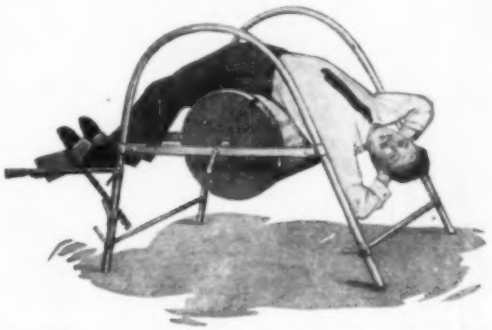
turning the dial to the next number. If no egg is laid, the flap does not move and the dial on the back remains unchanged. A shield prevents the counter from recording by contact with bushes and shrubbery.

BOOTS MADE OF SHARK HIDE USED BY FISHERMEN

By fashioning the hides of sharks into hip-high boots, finished for use in the mountains or along the trout streams, a northwestern shoemaker has developed a flourishing business. Because the footwear gives such satisfactory service, its popularity is increasing rapidly, and there is a steadily growing demand for the raw product, not only for that industry but for furniture upholstering.

ROLLING BARREL IN FRAME HELPS IN KEEPING FIT

To aid persons in keeping fit, an exercising machine made of a rolling cylinder mounted on a metal frame has been pat-

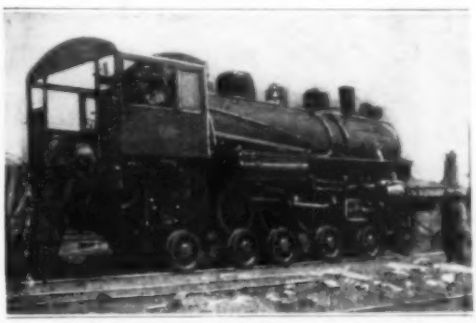


Exerciser That is Made to Cure Ailments and to Keep the Body Fit

ented. With the back on the cask, the feet firmly placed under straps on a board, the body is twisted left to right and up and down. This is aimed to develop the entire physique. An exercise to reduce weight is moving on the barrel while grasping the parallel bars of the frame.

ENGINE IS CARRIED ON TRUCKS, AS TRACK IS TOO WIDE

In South America, where the railroads are built to more than one width, it is often a problem to transport equipment from the seaports to the inland lines. Recently a road in the interior received new locomotives, which had to be shipped



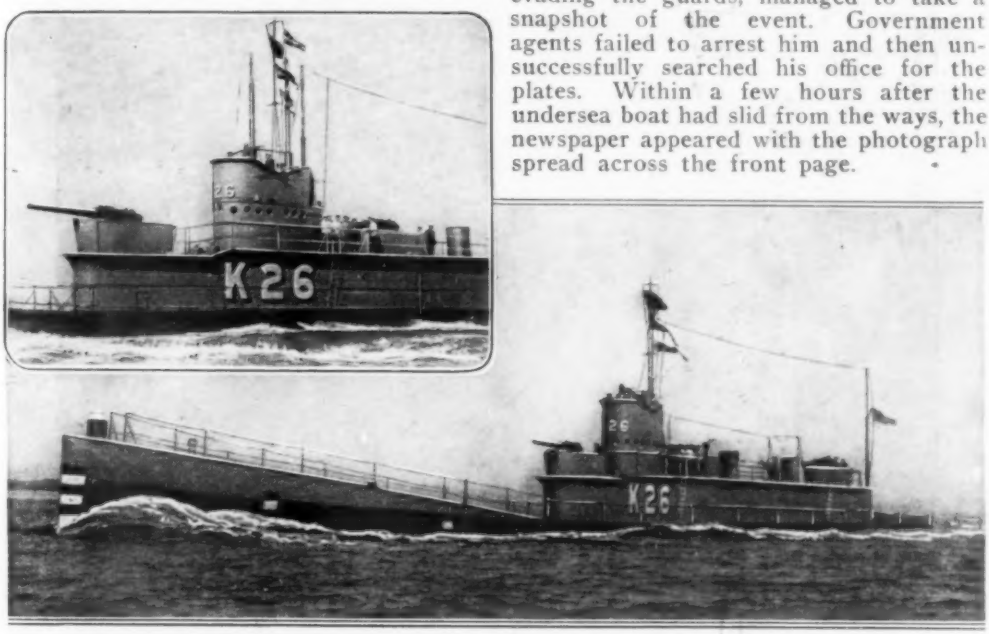
Narrow-Gauge Locomotive Riding a Specially Built Truck for Shipment over Standard Track

to it over a standard, wide-gauge track. On specially built trucks, whose wheels fitted the wider rails, the engines were hauled 40 miles and set up on the narrow gauge.

How High Pressure Steam from Boilers is Used to Smother a Burning Oil Gusher, about Which a Wall of Sand Has Been Built to Dam the Flaming Flood

SECRET OF SUBMARINE REVEALED BY CAMERA

Interest in England's large submarine, the K-26, said to be able to cruise across the Atlantic without a stop, is revived by the first pictures of the gigantic craft. Although great secrecy attended the launching, a newspaper photographer, by evading the guards, managed to take a snapshot of the event. Government agents failed to arrest him and then unsuccessfully searched his office for the plates. Within a few hours after the undersea boat had slid from the ways, the newspaper appeared with the photograph spread across the front page.



England's Latest and Largest Submarine Craft Undergoing Trials: Cruising on the Surface the Vessel Is Reported as Capable of Attaining a Speed Equal to That of the Average Ocean Liner

FIGHTING FIRE WITH STEAM SAVES MANY OIL WELLS

In the great oil fields of the West, where the ever-present danger of fire haunts the drillers, steam has been found to be one of the most effective means of combating the flames. As a flash of lightning, a spark from a piece of metal, or a lighted match, may start a blaze that will result in the destruction of millions of dollars' worth of property, ceaseless guard is maintained over the wells. Nevertheless, fires are frequent, and batteries of steam boilers are kept in readiness to fight them, as water would only aid their spread. When a gusher turns into a volcano of liquid fire, it is surrounded by a sand embankment to catch the blazing oil; then huge boilers are brought up, and jets of live steam are turned into the heart of the flames, slowly smothering them.

¶A section of inner tube makes an emergency substitute for a radiator hose.

PHONE NUMBERS ON A WHEEL ARE QUICKLY FOUND

To save time, a revolving telephone directory has been devised by a western railroad for attaching to the upright post of a telephone. The numbers are written on a slip of paper and pasted on the surface of a small, rotating wheel. Light and compact, for large establishments with private telephones, this contrivance also can be used for a record of departmental numbers.

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Spectacular Scene in Tableau at Paris Opera Ball in Which Beautiful Flower Fairies, Golden-Hued Birds, and Awe-Inspiring Dragons Sprang to Life at Summons from "Magician"

IRON-ORE ISLAND TARGET FOR AIRPLANE BOMBS

In the Pacific Ocean, near the coast of Panama, the island of Tortola, about 5 acres in size and composed almost entirely of iron ore, has been set aside by the United States government as a bombing target for army airplanes. The rocks, virtually lumps of pure metal, keep it from being destroyed by powerful explosions of the aerial bombs. Boats are prohibited from landing on the island or traveling within two miles of it. Launches patrolling the waters warn all craft, and a red flag, visible for miles, flies as a danger signal from the highest point.

Coast of Island Picked as Target for United States Airplane Bombers Because Explosions do Little Damage to the Five Acres Composed Almost Entirely of Iron Ore

FLOWER FAIRIES AND GOLDEN BIRD APPEAR AT BALL

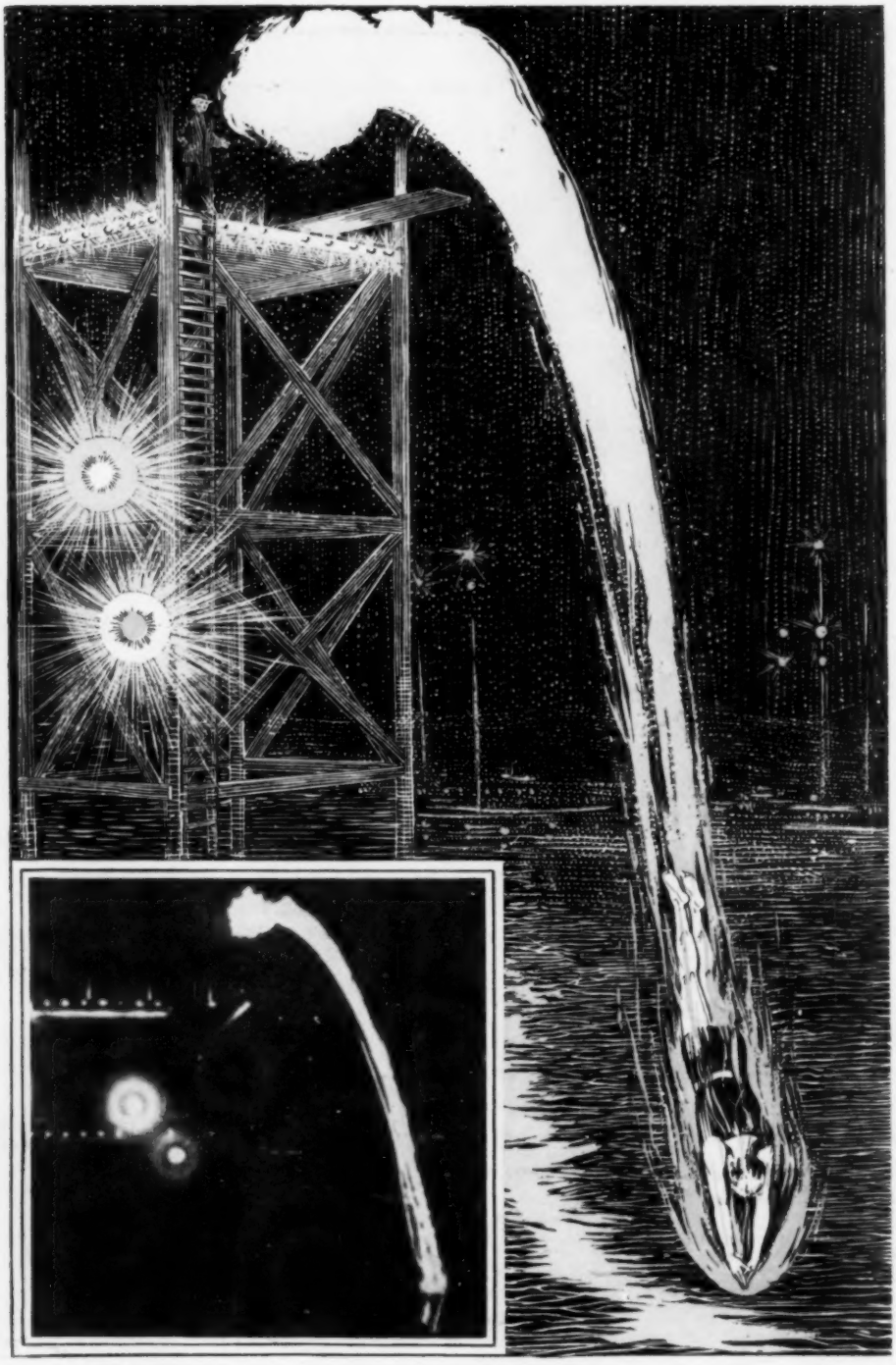
With a dazzling costume ball that combined the mysticism of the Orient and the grace, the richness, the splendor of the French court before the Revolution, this season's social activities in Paris recently were brought to a close. Against a background of black, a stately King Louis XV and his court marched with royal dignity, a Pompadour was borne in aloft by slaves, sailors of an early period swaggered by with backs laden with treasures from India, and the court and theaters of China, with a quaint display of finery, ended the procession. Posing as a Chinese sorcerer, a noted painter suddenly waved a magic wand and summoned flower fairies from the steps of a gigantic staircase. A fantastic golden bird, with iridescent plumage, leaped high into the air, and a great dragon swirled down to devour it.

At the reported price of 3,300,000 francs (about $350,000), the Italian government recently purchased, for patriotic reasons, the famous D'Este Bible, an illuminated manuscript in two volumes. It was formerly among the possessions of the late Emperor Charles of Austria.

AUTO GROUND BETWEEN CARS, BUT SIX ESCAPE DEATH

Wedged between two street cars, an auto was crushed to pieces recently in an accident in the East, yet no one was killed outright and one of the front headlights was not broken. The tires, front fender, radiator, one wheel, and a headlight were the only parts not destroyed. The chassis was bent out of shape, the engine wrecked, and body ground up, but the glass of one light was not even cracked. Six persons in the machine escaped death, but were severely injured. The wrecked auto was an object lesson in safety first.

Auto That had been Crushed between Two Street Cars, Showing One Headlight Unbroken



"Fire Diver" Leaping into Water in Blazing, Gasoline-Soaked Suit, and, Below, How the Plunge Appeared to the Camera's Eye: He was Protected from the Flames by the Speed of the Leap

"FIRE DIVE" AT NIGHT THRILLS CROWDS OF WATCHERS

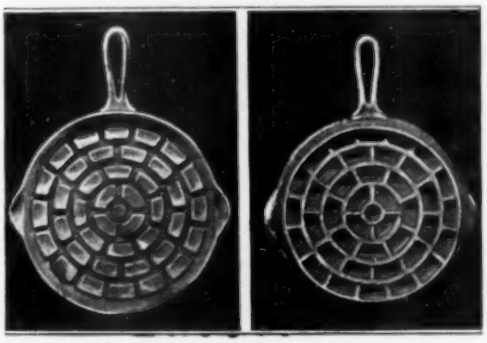
To thrill crowds, an expert swimmer in a western city, wearing a burning gasoline-soaked canvas suit, dives through the darkness at night from a great height into the deep waters of a bay. The swift plunge of the flaming body in the so-called "fire dive" is somewhat comparable to the sight of the passing of a meteor. Photographers made some remarkable pictures by exposing the camera through the entire dive, from the applying of a match to sinking of the body.

ICE KEEPS FRUITS WARM IN WINTER SHIPPING

Ice is used not only to keep fruits and vegetables cold, but also to prevent them from freezing while being shipped in cold climates. This is because ice is a poor conductor of either heat or cold and thus prevents the escape of heat that is furnished in railway refrigerator cars. Plain ice in large metal cylinders serves in winter, while a mixture of ice and salt is needed during the hot months to help cool the air.

FRYING PAN WITH GROOVES TO IMPROVE COOKING

Designed to prevent the burning of food, a frying pan has been invented, the bottom of which has a series of circular grooves so that surplus fat, instead of being partly absorbed by the meat while it is cooking, runs into them. Thus fatty meats fry to a nice brown and are better prepared. The channels are easily cleaned, as the grease prevents anything from sticking to them.



Cooking Surface of Frying Pan with Its Small Grooves That Catch Surplus Fat

AERIALS OF DE LUXE RADIO PLACED IN BALLROOM

Radio is not so widely used in France as it is in the United States. Expense of the devices is one reason. There, sets are made for use of the wealthy, who place them in the drawing room or ballroom, where they harmonize with costly furniture. One type is made to be placed on a table, the aerial being a ten-sided frame on top of the set. Close by, the magnifier is mounted on a 6-foot, ornately carved pedestal. This particular apparatus employs no outside wires.

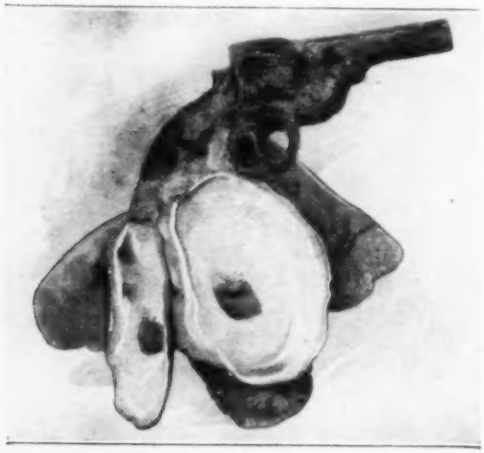
Listening to Message from French Radio, the Sound Intensified by Plate on Pedestal at Right

FLYING FUR-BEARING ANIMAL REPORTED FOUND

Without wings and heavier than air, a newly discovered type of fur-bearing animal, or bird that can fly, was reported recently to the French Zoölogical Society from the wilds of French Cochin China. About the size of a cat, the creatures are said to rise to a height of several yards by distending their stomachs until they appear like small balloons. Off the ground, they remain either motionless or slowly paddle themselves along with their webbed feet, not unlike the flight of a dragon fly, but lacking in its speed. The creatures have bills like ducks.

OYSTERS ATTACHED TO GUN ARE FOUND ON BEACH

Oysters attached to the butt of a rusty revolver were found recently on a beach in the South. They had taken several



Oysters Clinging to the Handle of a Loaded Revolver Thrown from Ship Years Ago

years to develop a firm grip on the weapon that probably had been thrown from a ship long ago. Although it contained cartridges, they could not be removed because of rust on the cylinder and in the chambers. The weapon is being shown in a museum.

BOOK COVER HIDES A VANITY CASE AND MANICURE SET

Manicure sets and vanity cases are now being combined in holders resembling books. When the cover is opened, the tools fitted in a folding roll, may be spread before the user. It can be kept on the dressing table or taken as a convenience when traveling about. The cover, decorated in the same way as ordinary volumes, can be fastened when closed.

PATENT GIVEN TO THE PEOPLE

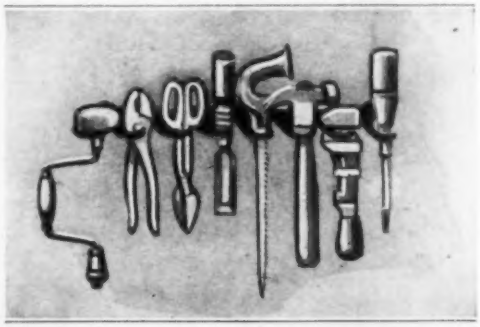
For the benefit of the public, the government has patented a water-resisting glue developed by one of its research departments. Any person may obtain the directions for its manufacture by applying to the bureau. It is an improvement on a glue made during the war by adding certain copper salts to the old formula, giving it more strength, resistance to moisture, and better working qualities.

SOVIET PICTURE CARS DRAW INTEREST OF PEASANTS

Throughout Russia, the Soviet government's picture trains, designed to teach communism to great masses of illiterate farmers, have attracted much attention. Huge crowds greet the cars and show great interest in the drawings that cover the coaches inside and out. Lecturers and government officers use the illustrations to show that the workers fare better than they did under the czars. These trains have been placed on all railroads, so that most isolated sections are reached by them.

RACK KEEPS TOOLS OR CLOTHES WITHIN EASY REACH

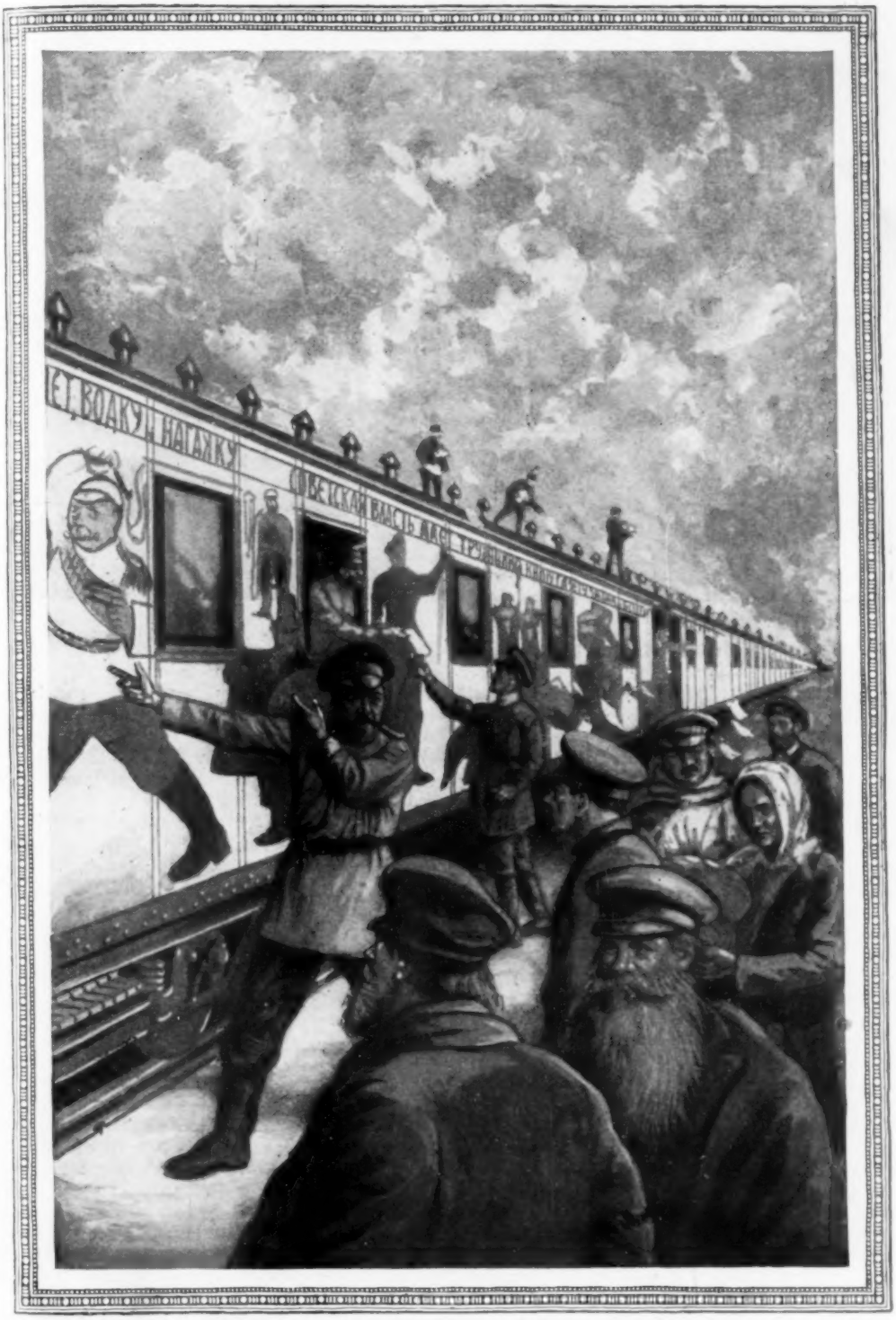
Tools that are easily mislaid or damaged by rough handling, can be protected when not in use, by a rack with hooks curved to the side, making it convenient to take down or replace articles quickly. The holder becomes a handy space-saver when attached to walls of garages and dwellings, or within reach of workbenches. By substituting it for nails and screws around bathrooms, and over kitchen sinks and tables, regularly needed



Space-Saving Rack That Keeps Tools within Reach and Protects Them against Damage

household utensils can be kept clean and safe from damage. Fastened to ceilings, the undersides of shelves, or in small closets, the rack offers a neat arrangement for hanging up clothing without danger of wrinkling.

¶ Found recently in the Tonga Island of the South Pacific Ocean was a turtle supposed to have been left there in 1773 by Capt. James Cook, the English mariner. Its finder reported that it was blind and creaked like an oxcart when it moved.



Remote Corners of the Former Land of Czars Are Reached by Agents of Russia's Bolsheviki Rulers in Trains Adorned with Picture Stories and Exhibits of Soviet Government

CITY-LOT FARM PAYS $2,500 PROFIT YEARLY

Vegetables in this City-Lot Farm Grow in such Profusion That There Is Hardly Room to Move About without Stepping on Flowers or Plants

With almost wizardlike touches of the hoe and spade, combined with inventive ability, a retired business man of the West has turned his back yard into a fairylike garden producing more than 160 varieties of fruits, vegetables, nuts, and flowers, bringing him a return of about $2,500 yearly. By an unusual arrangement of planting it is practically two gardens, one for small crops close to the ground, and another, elevated, for rambling plants.

Racks ranging from 10 to 40 feet in height support the vines of climbing plants. When one of these begins to form fruit, frames are erected to hold them well up in the air, where they receive plenty of sunlight.

A profitable section of the garden is that devoted to savory herbs, such as thyme, sage, caraway, dill, anis, wormwood, mint, and others, whose dried leaves and seeds are sold to druggists.

Crowded into this small space are 12 fruit trees, all bearing. Strawberries are grown in barrels to save space, while castor beans are planted in out-of-way corners, their stalks serving as climbing racks for beans and other vining vegetables. Twenty-five grapevines produce fine table grapes, for which the grower receives the highest market prices. Last year he sold 300 pounds of walnuts, 300 pounds of almonds, 350 pounds of peaches, 150 pounds of apricots, 140 large navel oranges, which brought 10 cents each; cut 28 pumpkins and squashes, picked as high as 50 pounds of beans a day, gathered hundreds of melons, and then donated specially developed seeds, bulbs, cuttings, and roots to farmers' organizations and civic clubs.

Accurate crop rotation makes possible this heavy and varied yield. Before one crop has ceased to produce, another is planted between the rows of the first. Every summer the soil is treated with fertilizer and the upper crust removed.

MINING THE AIR FOR GAS "ORE" IS PROFITABLE INDUSTRY

From sinking shafts in the earth, engineers have advanced to "mining" the air for gases important in the commercial world. After liquefying the air by subjecting it to heavy pressure, the various elements are separated. Oxygen obtained in this manner is used in oxyacetylene torches for welding and cutting steel and iron. Nitrogen and argon are employed in filling incandescent lamps. Neon, one of the rare gases, which is very sensitive to electricity, is used for testing spark plugs and in the manufacture of electric signs. It is said that $30,000,000 is invested in air-products plants in America.

U. S. ENLISTS SQUIRRELS' AID TO REFOREST TIMBERLAND

With the aid of squirrels, great areas of timberland in the Far West, lately burned over, are to be reforested by the government. At one time a price was set on the little animals' heads because they destroyed birds' eggs, but when the government offered to pay for green-pine cones, it was found that these could be obtained only with their help. The squirrels climb to the tops of the trees while the cones are still green, bite them off and carry them to nests from which they are taken by the forest rangers. When the government first obtained all the cones wanted, they were stored in a large warehouse that was destroyed by a fire originated by spontaneous combustion. Again the rangers went to the squirrels for help, and it was found that the animals stored the cones end to end to allow the passage of air. This arrangement was copied and no further trouble with fire was experienced. As a reward for their aid, the forestry service has ordered that only a few of the cones be taken and that others be left for the needs of the animal that gathered them.

PLANES RUN BY MUSIC ROLL WITHOUT AID OF PILOT

Without passenger or pilot, airplanes have been made to operate by means of an electrically controlled roll of paper perforated in the same manner as a music roll. With this device a plane has been started on a lone 20-mile flight, attained a height of almost a mile and a half at the end of the third mile, released a dummy bomb, circled for several miles, descended to 1,500 feet above the ground, snapped a photograph, and finally returned to its home station and negotiated a safe landing.

MAILS BAR IMPORTED BEES BECAUSE OF DISEASE

Because adult male honeybees are now subjected to a strange plague in many foreign lands, importing of bees through United States mails was forbidden by recent order. They may be sent in from Canada, though, because the government believes careful efforts are being made there to prevent spread of the plague. If for scientific purposes, special orders may be obtained, to permit sending them by mail.

ELECTRIC SCRAPER FOR SHIPS CLEANS SCALE AND RUST

For removing barnacles and rust from steel hulls of ships, an English inventor has designed a scraper driven by electric-

Scraping Rust-Coated Steel Plates of Ship's Hull with Machine Operated by Electricity

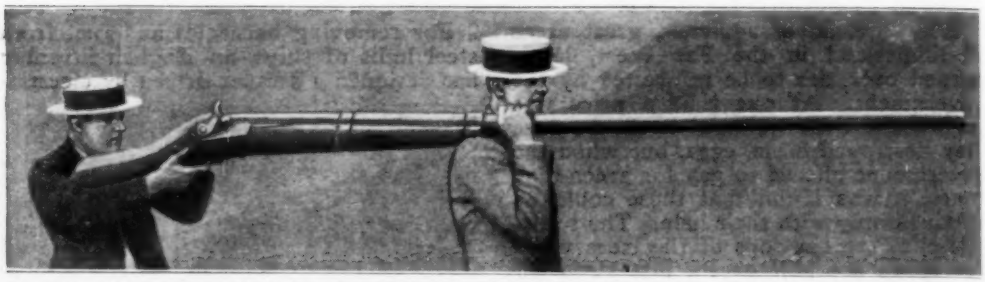
ity. Light in weight, it is easily held against the metal plates without exhausting the operator. Goggles must be worn for protecting the eyes from the fine particles it throws off.

BABY CRIB FOR TRAVELERS IS EASILY CARRIED

To overcome the difficulty of putting a baby to sleep in a strange bed, a collapsible crib that can be carried or shipped easily as part of the luggage, has been patented for travelers. When not in service, it folds into a compact package, 4 inches square and 40 inches long, weighing 40 pounds. To set it up or dismantle it, four thumbscrews in upright posts are loosened or tightened. As the sheets covering the framework are easily removed, and clean ones substituted, a sanitary bed may be provided for the baby at all times. Either of the long sides may be lowered, thus enabling the mother to place the crib against the side of her bed so that the child may sleep near her.

Once reckoned one of the fastest vessels of its type in the world, the "Glory of the Seas," a famous clipper ship, was burned on the beach near Seattle recently, after efforts to have it preserved as an historic relic had failed.

FIVE HUNDRED DUCKS KILLED BY ONE SHOT

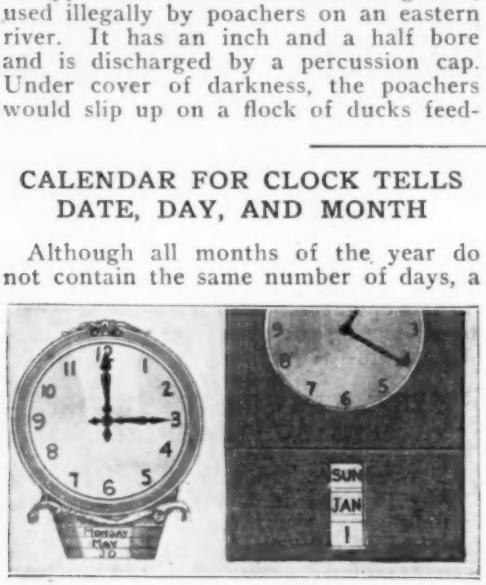


Gun, Nine Feet Long with Inch and a Half Bore, That Kills Five Hundred Ducks at a Single Shot, Was Fowling Piece of Hunters Arrested by Federal Officers

More than 500 ducks were killed by one shot from a nine-foot gun, similar in appearance to a muzzle-loading rifle, used illegally by poachers on an eastern river. It has an inch and a half bore and is discharged by a percussion cap. Under cover of darkness, the poachers would slip up on a flock of ducks feeding along the river edge and blind them with a powerful searchlight. As the birds fluttered aimlessly about in the strong glare, the piece would be trained on them, a single shot bringing down hundreds. Government officials finally captured the law breakers after hiding for five nights in succession.

CALENDAR FOR CLOCK TELLS DATE, DAY, AND MONTH

Although all months of the year do not contain the same number of days, a



Accurate Date Attachment Fitted to Clock to Give It Useful Features of a Calendar

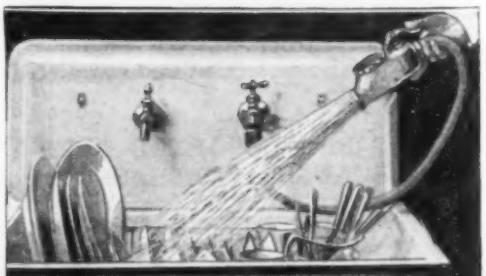
date attachment for clocks, recently patented, overcomes that difficulty and makes it possible for a timepiece to automatically give not only the date, but the day of the week and the month. Any clock may be equipped with it. The device needs no regulating.

POUND OF SUGAR COSTS MORE THAN SOME JEWELS

Sugars that cost from $75 to $375 per pound, because of the excessive care required to make them, are used in scientific laboratories. One is useful in detecting typhoid germs, as these tiny organisms multiply rapidly when feeding on it. A sugar, made from corn cobs, brings $120 per pound, while another, manufactured from scraps left over in making vegetable buttons, sells for $140.

SOAP IN NOZZLE SPRAY AIDS IN WASHING DISHES

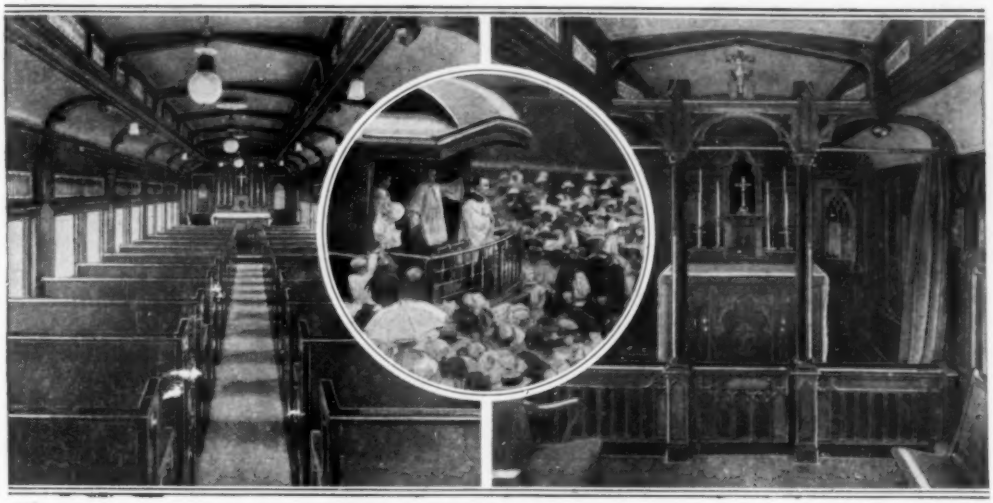
For quick and easy dishwashing, a nozzle that sprays either soapy or clear water, has been invented to connect with any faucet. Pressing a trigger above the handle causes a strong stream of soapy water to flow against a wire tray. Releasing it brings a spray of clean, hot



Pressing a Trigger at the Nozzle Causes this Dishwasher to Spray Soapy Water

water. It has no delicate mechanism to get out of order, needs no power, and does not require cleaning. The washer also may be used to cleanse vegetables.

CHURCHES ON WHEELS CARRY RELIGION TO THOUSANDS



At Left: Pews of Traveling Church; Center: Missionaries Preaching to Crowd from Observation Platform; At Right: Altar and Sanctuary, Behind Which are the Living Quarters

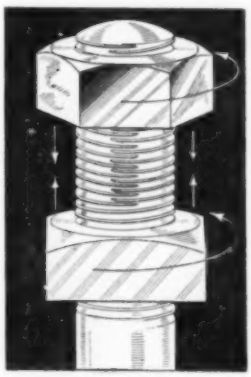
Miniature churches on wheels are being used by a missionary society to carry forward its work in the sparsely settled sections of the United States. Already three railroad cars have been put in service in the South and West, visiting small towns that are churchless. One of these cars is 86 feet long and is equipped with pews for 75 persons as well as an organ and other fixtures of a church. It is lighted by electricity, and running water is supplied by overhead tanks. The same organization is experimenting with a motor chapel, which, unlike those that have appeared in several foreign countries, is built on a trailer instead of being fastened directly to the frame, similar to the ordinary touring car.

SAIL HITCHED TO WINDMILL FIRST BY MISSIONARY

As a result of a missionary's observations nearly three quarters of a century ago, the manufacture of windmills has developed into a large industry. He originated the device that makes it possible to automatically regulate the speed of those machines. Stationed at the Bad River Indian reservation in northern Wisconsin, the clergyman needed a wind-driven pump to supply water for the post. Windmills of that day could not be kept into the wind, or the speed regulated. Noticing that the sail of a boat would swing into a position with the wind if unrestrained, he reasoned that a perpendicular saillike rudder fixed to the wheel, and mounted on a pivot, would keep it broadside to the air currents. From that idea came the modern windmill that often furnishes enough power to run several pieces of farm machinery, besides pumping the necessary water.

NUTS ON DOUBLE LOCK BOLT CANNOT WORK LOOSE

Unique in design, a recently patented bolt has two nuts, both of which turn in the same direction, but while one moves upward, the other goes downward until the two lock at the desired point. This movement is the result of the positions of the threads. Any pressure exerted on the nuts, either from above or below, only tends to lock them more firmly together. They afford the maximum amount of security when adjusted and are not affected by jars or vibration such as they would be subjected to on automobiles.



Facing Death in Wilds of Peru

BY J. T. EDWARDS JONES

Bloodsucking "Vampire" and "Whisky-Faced" Monkey

STUNTED forests, cathedral-like caves, a jungle wilderness of beauty and of death far from the beaten paths of civilization, are described by explorers for Field Museum, Chicago, who recently returned from a 7,000-mile trip through the wilds of Peru.

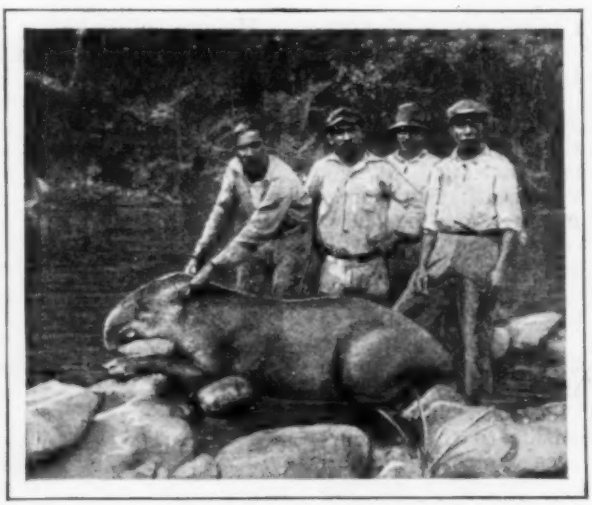
Outlaw bands, strange Indian races that are said to eat their grandparents, bloodsucking bats known as "vampires," "whisky-faced" monkeys, "oil birds," and a curious rodent called the "dinomys," of which there is said to have been only one previous specimen on exhibition in the world, were encountered.

Edmund Heller and Rare "Rucupi" He Made into a Pet

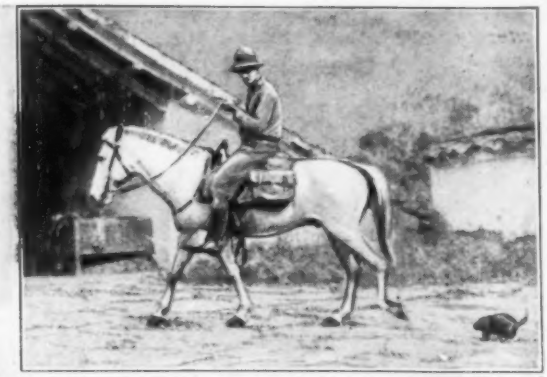
With the record of the hardships of his expedition written in the deep lines on his face and with his left arm in a black sling, slowly mending after four operations, Edmund Heller, companion of Theodore Roosevelt in the latter's explorations in Africa, told of the adventures he and his wife met with during their 14-month trip through one of the least-known and almost uninhabited regions of South America.

In his search for rare specimens for a middle-western museum, the two covered thousands of miles of trackless jungle, infested with numberless wild animals, and traversed countries where epidemics of terrible, nameless diseases had swept away almost the entire population. Sluggish tropical streams were forded in long, unwieldy dugouts under canopies of rank vegetation through which the sunlight dripped like sewage through a filter.

Sometimes cutting a trail afoot through almost impenetrable forests, then riding pack mules down into sizzlingly hot jungles and on into cold moorlands where civilization ends, they made their way to a plateau elevated 12,000 feet above the sea level, where they found a tribe of Inca Indians who could not live in lower altitudes. Before



Tapir Killed in Forest Stream by Party of Explorers during Expedition in British Honduras



Rare Rodent Known as the "Rucupi" Following the Explorer, Who Made a Pet of It, and, Below, a Camp Pitched on the Edge of a Swamp near the Huallaga River. A Few Miles Away Is the Cave of the "Oil Birds," with High-Vaulted Ceilings as Beautiful as Those Described in Fairy Stories. It Was There That the Explorer and His Party were Charged by an Ocelot. Firing into the Dark at the Gleaming Eyes, the Naturalist Wounded the Animal and Finally Killed It

Snowcapped Peak of Lofty Andes Whose Slopes are Covered by Dense Forest, Inhabited by Descendants of the Incas, Who Cultivate Coca, from Which Cocaine is Extracted

surmounting the Andes, a group of outlaws was encountered. There were no laws and no taxes and most of the inhabitants were fugitive murderers.

"Their leader was quite a nice chap," declares Heller. "He had killed a few men, I understand, but he treated me very kindly."

In company with the bandit chief, he visited a cave inhabited by "oil birds."

"As beautiful as those in fairy tales," the explorer said, "the cave looked like a great cathedral inside. Birds—thousands of them—lived there."

In the darkest corner of the cavern, two flaming eyes stared out at the intruders. With a gasp, Heller raised his gun, which was loaded only with bird shot, and fired.

Before the thunderous echoes and the noise of invisible wings subsided, a furry shape rolled to the feet of the party. As they stared down, it moved and a native, armed only with a knife, jumped on it, slashing wildly.

When finally the animal was killed, it proved to be a large ocelot. Some of the birds that fell at the shot were seized by the guides and later squeezed to obtain something resembling olive oil. This was used for everything from rheumatism to food.

Then the march was continued through uninhabited wilds where it rains every day. Here was found an anteater that has a tail which it uses for an umbrella; a vampire bat that comes by night and sucks the blood from horses and other animals, and of human beings if it can find an arm or a nose sticking out from under the bedclothes.

Strange pets were encountered that ate and slept with the explorers. There were opossums that lived among the luggage, a small weasel that made its home in a stocking while traveling, the young "dinomys" which was called by the native name of "rucupi." Weighing 10 pounds, the latter was carried by the explorer, but, as it grew, a porter was provided, and later a horse, for its convenience.

In Para, Brazil, where the journey ended, one of the pets bit the explorer severely on the left forearm. Blood poison set in and for a time he was in danger of losing his arm.

Another scientist attached to the same museum, Karl P. Schmidt, who recently returned from a lengthy trip in the wilds of Honduras, tells of capturing a 5-foot crocodile with his bare hands.

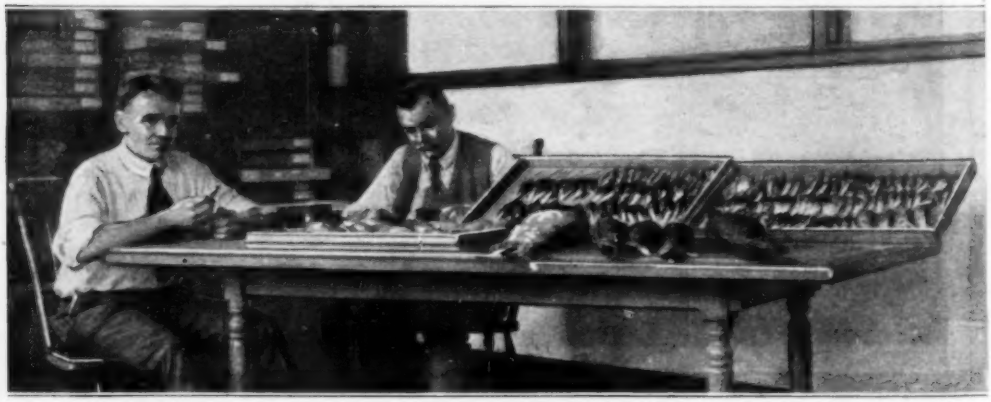
After a long journey through dense tropical swamps, the scientist's party arrived at a small lake.

Peering through the undergrowth that surrounded the shore, the naturalist sighted a crocodile, and, armed only with a small-caliber rifle, hastily clambered into a clumsy dugout and paddled furiously after his quarry. The animal silently lowered itself from its log in the sun, bubbles of marsh gas on the slimy surface marking its tracks.

"Here he is!" shouted the hunter to his companions on shore. And the chase was on. Paddling rapidly, the lone canoeman kept within a few feet of the monster, prodding it continually with a long pole.

Suddenly, the vegetation parted at the bow of the canoe, a yawning snout was thrust forward, with its rows of hideous teeth. A hastily aimed shot missed—and the "croc" again slowly started to sink.

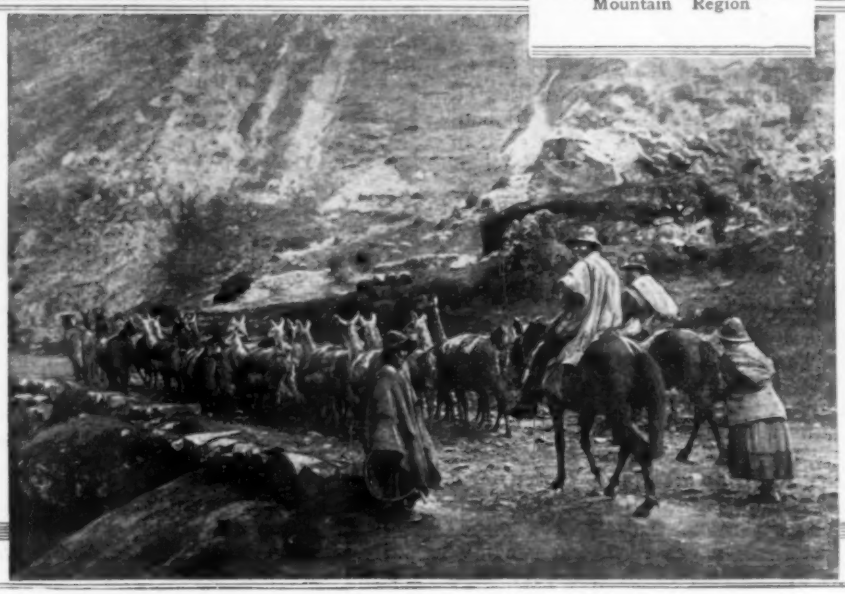
Throwing aside his light rifle, the explorer leaped into the shallow lake, grasped the creature and waded ashore.



Museum Scientists Examining the Gorgeous and Glittering Display of Two Trays Filled with Specimens of Many-Hued Humming Birds Gathered by Explorers during Trip to Central Peru

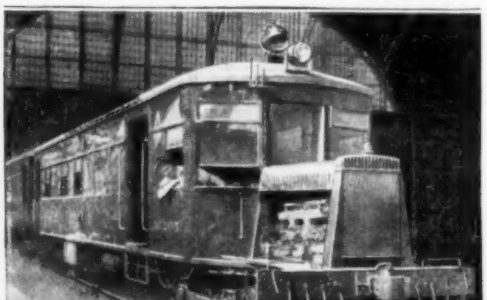
Great Ant Bear and Native Boy

Fording Tropical Stream and, Below, Explorer's Party and Pack Train of Llamas Traversing Cold Moorlands in Snowcapped Mountain Region



STEPS ON THROTTLE INSTEAD OF PULLING IT OPEN

To replace locomotives on short-line runs, a railroad in the central West has had constructed a specially designed gasoline engine, similar to that of an



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Gasoline Motor Train Designed to Replace Steam Equipment on a Railroad's Branch Lines

automobile, that is capable of pulling two steel coaches at a speed of 70 miles an hour. One of the cars is entirely for passengers while the other is divided into the engineer's cab, a baggage room, and a smoking compartment. Officials of the road assert that this equipment provides better service to patrons off the main line.

CITY BURIED BY DESERT SAND YIELDS ANCIENT CULTURE

In search of additional traces of an ancient civilization, a Russian explorer who discovered the city of Kara-Khoto in the shifting sands of the Mongolian desert, recently announced his intention to lead a second expedition through that section and Tibet. While outlining the plans of this venture, the scientist related the difficulties encountered on his first trip. For years there had been rumors of a dead city, abandoned by its inhabitants centuries ago. Nomadic tribes were suspicious and declined to help. Working patiently, however, the explorers employed a Mongolian to travel about in that region in the guise of a merchant in an effort to obtain information. The natives shunned this representative of the foreigners until a storm one night compelled him to camp near the buried city, although he was unaware of the fact. After that, no more trouble was experienced, as the natives regarded that incident as an indication of the favorable attitude of their gods. Although the ruins of streets and houses had been worn down by wave after wave of traveling sand hills, many remains of Buddhist temples, Mohammedan mosques, packages of Chinese paper money, inscribed with threats of death for counterfeiters, silver ornaments and coins, all apparently carefully hidden by the original owners, were found. Outside the walls was a cone-shaped monument containing a library of 2,000 books, written in seven Eastern languages. Other relics helped to substantiate legends about the fate of the inhabitants. In the thirteenth or fourteenth century, the Chinese sent an army to capture Kara-Khoto. The siege waged for years until a Chinese engineer conceived the scheme of blocking the river that flowed through the city and gave the inhabitants their water supply. Bags of sand were thrown across its channel and the course diverted. The besieged, frantic from thirst, sought water by digging a well within the walls. But that failed. Then in desperation, the chief ordered the populace to bury their treasures and killed his wife and daughter with his own hand. In the battle that followed all the inhabitants were mercilessly slain by their foes.

HURDLE RACING FOR DOGS IS POPULAR SPORT

Matching greyhounds, the speed kings of dogdom, in hurdle races has become a popular sport. Throughout the United States there are many kennels devoted almost exclusively to the raising of these fleet creatures for the racetrack. At a

Racing Greyhounds Taking a Hurdle in Their Swift Flight Around Racetrack

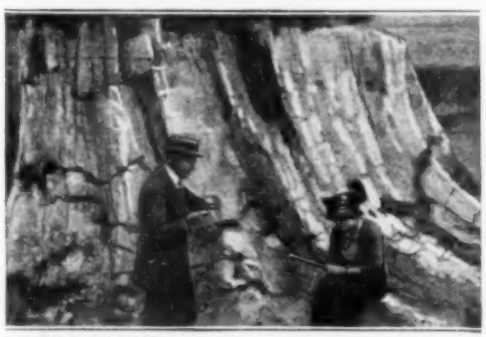
recent meeting in an eastern city, greyhounds from all parts of the country participated in what was termed a world's championship contest.

SHIP FOUND ON BIG ICEBERG REVEALS MYSTERY OF SEA

For centuries mystery ships have sailed the seas, guided only by the winds of chance. One of them was found by a steamer captain rounding the Horn recently. While groping his way into the open, a gigantic mass of ice carrying a large three masted schooner, with its boats still in the clefts, was sighted. Efforts were made to find the survivors but no trace of them was discovered. Another sea tragedy was added to the already long list of those as yet unsolved when a Greenland whaler came upon a strange looking derelict, battered and weather-worn, apparently built in the last century and ice bound for years. A boarding crew found in the cabin the body of a young woman, preserved by the arctic frosts. Near a long dead fire was the remains of a young man, still holding a flint and steel.

PETRIFIED FOREST, MILLIONS OF YEARS OLD, FOUND

Millions of years old, petrified trees, presumably the remains of a forest of 2,000 acres or more, have been excavated in the vicinity of Pikes Peak, Colorado, at an altitude of 8,000 feet above sea level. The trees are covered with a strata of volcanic ashes and lava and appear similar to the redwoods of California, which flourish at an altitude of 2,000 feet. The theory has been advanced that when the Rocky Mountain range was formed by expansion of the earth's crust, the existing mountains in this locality were elevated another 6,000 feet, and that Pikes Peak, then a crater, turned loose a destructive flow of fiery liquid which leveled the forest.



COURTESY C. F. WHITNEY

Shattered, Petrified Stump of One of Giant Trees Which Flourished Ages Ago

TALKING THROUGH SEA EASY WITH WIRELESS PHONE

Talking through solid stone walls from submerged submarines or from below the earth's surface, is said to be possible by means of a radiophone invented recently. Use of the instrument, it is believed, will reduce the hazards of underground and undersea work that have caused the loss of hundreds of lives in the past. Entombed miners or laborers entrapped in fallen caissons, men engaged in the building of tubes under water, and crews of disabled submersibles, will be able to direct the work of rescue with the device. Simply constructed, it requires no aerial or ground and is so compact that it may be carried easily. Power is supplied by small dry batteries which operate novel transformers, these generating the electric waves. It has a range of 200 feet under ground.

Radiotelephone That Carries Voice through Earth, Water, or Stone without Use of Aerial

SO OIL TRUCKS CAN'T EXPLODE

To carry away static electricity from oil trucks and thus lessen the possibility of explosions, iron chains that dangle to the ground are fastened to the frames. The same principle is applied to oil pumps.

¶A crutch tip on the head of a hammer serves as a rubber mallet.

ONE-MAN ADJUSTABLE SAW WEIGHS BUT SIX POUNDS

Folding into a small space and weighing only 6 pounds, a one-man saw recently invented is provided with a handle adjustable to almost any angle. It permits the worker to stand erect, thus doing away with tiring strains. Hand grips attached to the frame may be moved back and forth to meet requirements. When not in use, the saw may be folded up and carried easily.

Woodman Using One-Man Saw Constructed So He Can Work in Upright Position

WEIRD DRUG CULT IS DYING OUT IN THE FAR WEST

Chewing peyote, found in the top of the spineless cactus, is said to make members of an Indian cult confess their sins. For 20 years the cult, known as Peyotism, now passing out of existence, has been a picturesque religion in the West. Their rites are conducted while the members are under the influence of the drug. A ne'er-do-well of the Indians, who became a victim of the peyote habit, introduced the religion to his people after weird visions had come to him while under the influence of the drug.

WORLD'S OLDEST LIVING THING SAVED BY HIGHWAY

Construction of a highway is preserving for future generations the oldest living things on earth—the big trees of California. The Redwood Highway, the first links of which have been opened to travel, is to pass through the forests and groves of redwood that still dot the Coast Range mountain country, where it is believed the giants began to grow before the dawn of Christianity.

By reserving some in national parks and forest preserves, the government has saved many of the groves from the lumberman's ax, and at the same time provided places of interest for the tourist. Protective organizations that turn over each grove as rapidly as funds can be raised to buy it, to the state, have found most of their aid coming from the motorists who see and admire the big redwood trees while traveling over the roads passing through them.

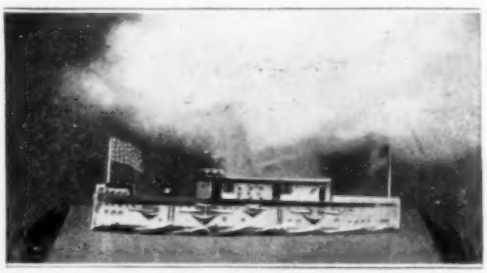
This tree grows about 30 feet in its first 10 years, and thereafter very slowly, until at the age of 60 years it is only about 60 feet high and not more than 14 inches in diameter. They are believed to have required from 10 to 20 centuries to reach the present size.

ARROW POISON TO KILL BUGS IN PLACE OF NICOTINE

From the tuba root, formerly the source of a death-dealing poison with which the "wild men of Borneo" coated their spear heads, and which is still used in the Malay states for killing fish, scientists have developed an insecticide reported to be a substitute for nicotine. Although the plant is poisonous to man as well as insects and animals, the experts hope to extend its use to relieve the shortage of bug-destroying drugs. The fatal fluid is crushed from the green stems, or drawn from the dry roots with chemicals.

WIRELESS RAY CONTROLS BOMB TO BLOW UP BATTLESHIPS

Touched off by a radio ray, a bomb has been invented that is powerful enough to blow up a battleship. It is said to be so small that one could be carried aboard without detection, and, after concealment, exploded by a special wireless wave released many miles away.



Blowing Up a Miniature Battleship with a Bomb Fired by a Special Wireless Wave

Hundreds of Radios Are Used to Broadcast Weather for Millions of Persons

Farmers, Sailors, and Shippers Are Protected by Government Service That Sends Out Warnings of Approaching Storms

SO vast has been the progress of radio development that now its swift energy is being harnessed to broadcast weather reports, resulting in untold savings for farmers and shippers, and adding to the safety of navigation. Government experts were quick to see the importance of a recent report that 573 broadcasting stations had sprung up throughout the country, and that between 2,000,000 and 3,000,000 people "listened in" daily. Only one state, Mississippi, is without a broadcasting station.

As a result, it has been planned to extend perhaps the greatest weather-broadcasting service in the world. Already more than 150 stations are sending out weather news, and the number is being increased daily in response to demands from both rural communities and cities. Besides the larger stations, there are many smaller ones that pick up the reports and pass them along.

From the great naval plant at Arlington, the wireless telephone sends out forecasts three times every day. From others there are two reports daily, one in the morning and another at night. So interested are the farmers in the service, that they have sent in many demands for it to be speeded up.

"Can't you folks get the weather here before I have to go to bed?" one rural citizen in Minnesota wrote to his congressman.

Investigation disclosed that he had been receiving the reports every night at 10:05 o'clock on a homemade radio "set"

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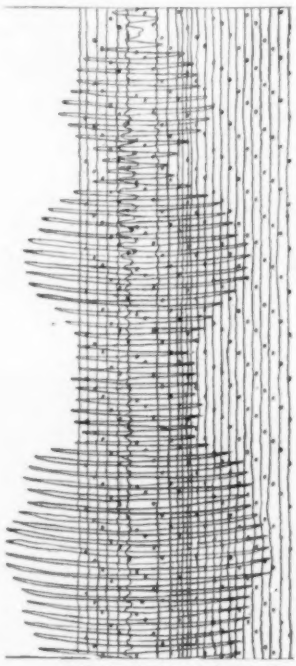
Sending Standard Time by Radio from Naval Observatory: Above, One of the Balloons Sent Up Daily from Many Stations to Chart the Upper Air for Weather Forecasters

built and operated by his young son.

To help those who retire early, efforts are being made to get the forecasts out before bedtime, but, because of the large amount of work required to make them up, it has proven quite difficult.

Surrounded by many strange instruments, the government scientists watch the progress of storms, cyclones, cold waves, and hurricanes moving across the country or approaching it from the sea. As a result, they are now able to predict floods as much as ten days or two weeks before they happen.

One of the latest developments has been the charting daily of the upper-air currents thousands of feet above the earth's surface. This is done with toy balloons that sometimes reach a height of several miles. Besides being of value in making general forecasts, the results of these experiments have proved of great aid to aviators, enabling them to pick air levels where winds are favorable to their journeys.



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Record of Earthquake in Rome Made on Instrument in Chicago

Weather maps made up every morning and night show the results of hundreds of reports sent into five forecasting centers by telegraph. Information from ships received by wireless also is used in charting the course of storms before they reach the seacoast. Experts regard the wind's force and direction as the principal factor in making their predictions.

By charting the high and low pressure areas as they exist in all parts of the country at a given time, and knowing the cloud movements, changes that will take place in any section within 36 hours can be told with the greatest accuracy.

"Will next week be good haying weather?" the farmer wants to know, and the answer is sent to him, wherever he may be, by radiophone twice a day.

"Will orchard heaters be needed tonight?" the vineyard owner inquires before retiring, and looks at the map he has received by rural delivery that day to find out.

"What degree of cold must I protect this citrous fruit against?" the western shipper wonders, and the reply comes in an instant over the telephone he uses to connect him with the nearest weather man.

These are but a few of the ceaseless activities of the weather bureau in protecting the lives and property of the citizens of every community.

Warnings have been sounded by the weather man from 12 to 24 hours in advance of every big storm on the Great Lakes or ocean coasts of the United States for many years.

Eighty-eight and four-tenths per cent of the daily forecasts are accurate predictions of conditions 36 hours later, and scientists are seeking, by use of new methods, to make them more exact.

Delicate instruments record the duration of sunshine, and whirling thermometers, with wet and dry tubes, measure humidity of the air. Anometers show velocity of the wind, and gauges register the amount of rainfall.

The barometer and a device, called an aneroid barograph, indicate air pressure. Sitting in his office, the scientist can read the outdoor temperature on a telethermograph that rests on his desk. Some of the stations use a triple register to record sunshine, rainfall, and speed and direction of wind.

Areas of high and low air pressure are foretold when the scientists know at what speed and in what direction winds are moving. This information is received from hundreds of observers and charted on the weather maps and in the records.

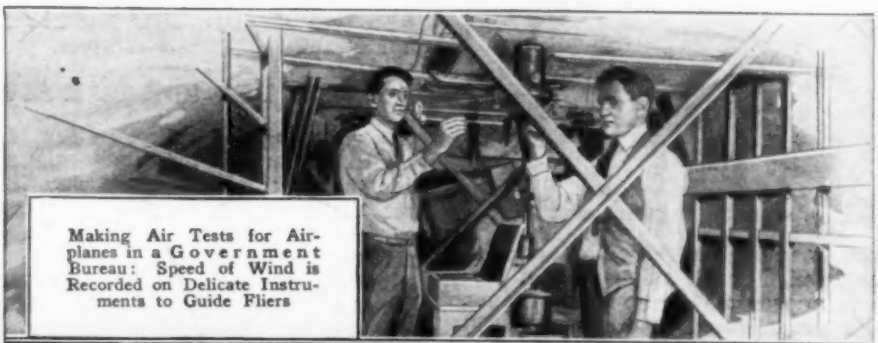
Study of cloud movements and careful comparisons of maps showing weather for several days past, are used as a basis for the forecast.

Most of the weather in the United States, according to government observers, comes from Canada. Because of its central location on the continent, Medicine Hat is noted for the storms which have had their origin there.

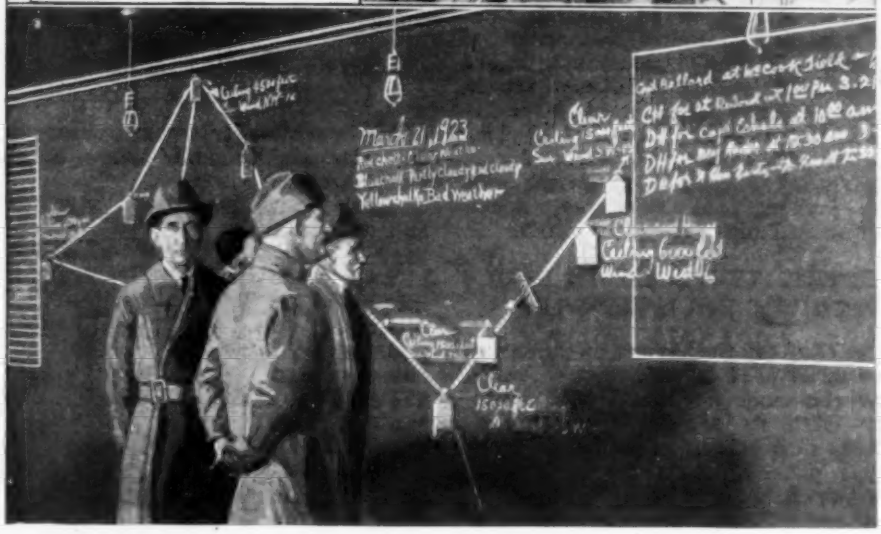
As far back as the records go, however, it is declared that there has been no perceptible change in the weather of the nation, either in the heat of the summers generally, or the severity of the winters.

MAKING THE WEATHER FOR NATION'S MILLIONS

Left to Right: Barometer to Record Air Pressure; Inventor with Machine That Predicts Tides; Measuring Rain and Snowfall



Making Air Tests for Airplanes in a Government Bureau: Speed of Wind is Recorded on Delicate Instruments to Guide Fliers



Where Radio Reports on Weather Conditions Aloft at Various Flying Fields and Airplane Routes are Recorded with Chart, Showing Location of All United States Army Fliers

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CROSS IS MADE WITH PINS TO REPRESENT JEWELS

Although 92 years old and an inmate of a home for the aged, a western man

Reproduction of a Famous Jeweled Holy Cross Studded with Thousands of Pins

recently completed a reproduction of a famous jeweled cross, using colored pinheads to represent the precious stones inlaid in the original. More than 15,000 pins were required in its making, each carefully placed to follow the design of the original. Weeks of painstaking effort were necessary, yet the finished article was exact in every detail, even to the intricate patterns formed by the priceless gems. Brooches set with clear and colored glass were used to represent diamonds, rubies, and amethysts, while opaque-headed pins served as pearls.

ELECTRICITY TO AID IN WAR AGAINST BOLL WEEVIL

Electricity is the latest weapon of science to be used in the effort to exterminate the boll weevil in the cotton states. With its aid, cheaper methods have been devised for producing a poison that has proved deadly to the insects. Heretofore, it is reported, the supply has been short and the product expensive, since nitric acid, one of the principal chemicals in the old mixtures, has fluctuated considerably in price. With these two drawbacks eliminated, the experts expect the insecticide to become more popular, resulting in larger yields and fewer losses. It is estimated that 700,000,000 pounds are needed annually, yet only 30,000,000 pounds are now used. The boll weevil first came to the United States from Mexico, and within 15 years has spread throughout the South. Authorities figure that the annual damage caused by its ravages amounts to almost 400,000,000 dollars.

ONE MAN'S INVENTIONS KEEP MILLION PERSONS BUSY

Through the inventive ability of Thomas A. Edison, nearly 1,000,000 men and women in America alone, it is estimated, are furnished steady employment. For the most part, the work is clean and wholesome and the employes well paid. Thousands are engaged in the manufacture of electric-light bulbs, one of his greatest discoveries, and in making phonographs and other devices.

DIG NEW BED FOR ISAR RIVER

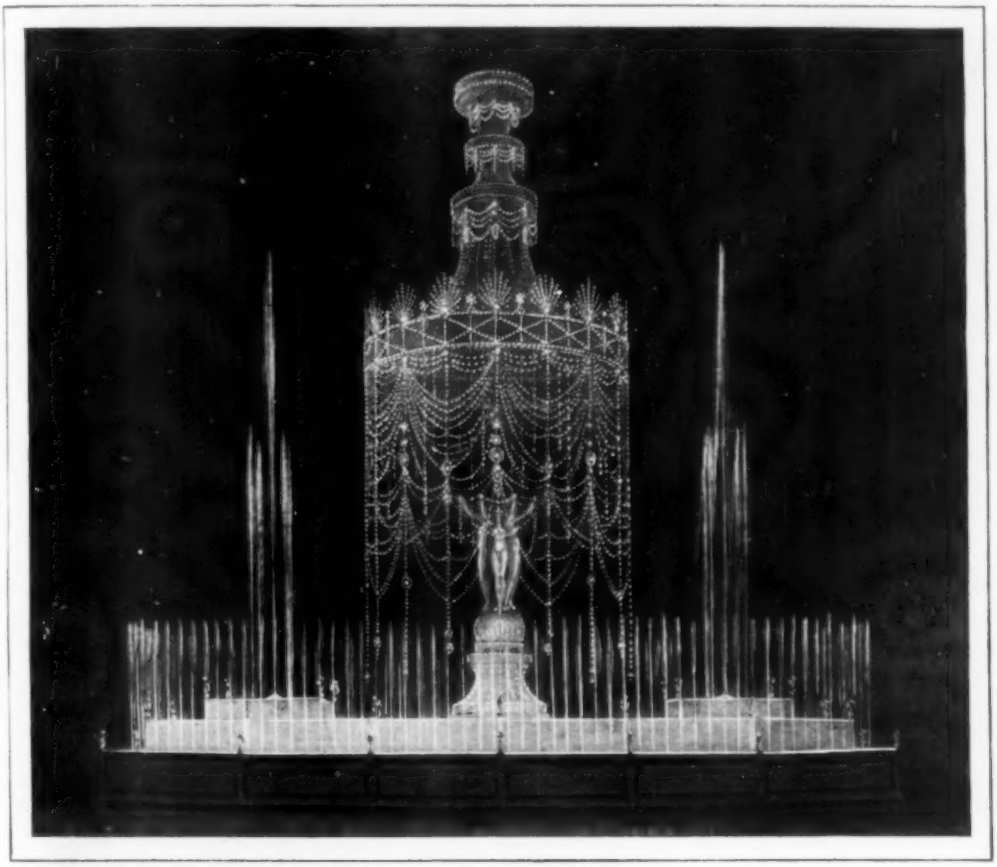
By changing the course of the Middle Isar River, Bavaria expects to make possible the development of an electric current totaling 480,000,000 watt hours a year, an output that will put the plant among the largest of the world. It is estimated that this use of water power will result in a saving of 500,000 tons of coal annually. In digging the river's new channel, 7,000 men were employed.

CRANKLESS FREEZER FOR ICE CREAM SAVES LABOR

In a crankless ice-cream freezer now on the market, ice and salt are packed around the cream can and also in a metal tube that extends through the mixture. In this way cold comes from all angles, making the double freezing even. Because of its lightness, the freezer can be carried on autos and to picnics. Freezing takes place in about an hour and 15 minutes for cream.

FORTY SEARCHLIGHTS EQUAL MILLIONS OF CANDLES

During a celebration in a midwest city, 40 big searchlights throwing 450 million candlepower of light, were used to illuminate the place at night. Towers 90 feet high, each festooned with 50,000 crystals, shed floods of dazzling splendor, rivaling the rainbow in gorgeousness. Around the bases of these minarets, a forest of water jets seemed to spurt liquid light into the air, and sparkled under the spangled hues cast upon them from the jeweled draperies above, while electrical displays were used to strengthen the effect of the crystal designs.



Jeweled Minaret Draped with 50,000 Crystals That Reflect Floods of Rainbow Tints: Water Jets Serve to Give It an Appearance of a Fountain of Liquid Colors

SOFT CORAL ROCK HARDENS WHEN USED IN HOUSES

Houses in the Bermuda Islands with walls of coral rock are cool and fireproof. The substance is a poor conductor of heat. Slabs for roofing are made waterproof by being covered with a coat of asphalt or tar and then whitewashed. Because under the surface the rock is almost as soft as cheese, though it looks like a chalky limestone, it can be cut with primitive tools. It is quarried in blocks 6 feet square and several feet deep, and broken off with a strong pole. Natives with big saws cut these pieces into various sizes for building. When exposed to air they become hardened. If in contact with weather for some time, the rock breaks into pieces, but when used for interior walls, it is said to be ideal, as it keeps out heat and is fireproof.

¶ It is a generally accepted rule that the more brilliant the color of a flower, the less fragrant its perfume.

Passing of the Lumberjack Recalls Heroic Drama of the Woods

Days of Rawhide for Leather, Buckskin for Cloth, and Venison for Beef, Are Followed by Chugging Switch Engines, Portable Sawmills, Electric Lights, and the Radio

AS heroic and romantic a figure as the scout, trapper, or Indian of frontier days, the lumberjack is fast fading from the screen of American life.

Wars, raids, and feuds of one camp against another, where iron fists, backed with 190 pounds of muscle, took part in free-for-all, knock-down-and-drag-out, kicking, and gouging battles, have passed into memories of an age that is rapidly passing away.

In the vast solemn forests of the North and West, the ring of the ax is still heard, flexible ribbons of steel sing as they bite through the pine under the graceful swing of powerful shoulders, and the "Hi! yup!" cry of the teamsters echoes through the thickets of birch and balsam.

But above it all comes the shriek of a switch engine, the shrill whine of a circular saw tearing apart the logs, and in the clearings are ugly frame buildings covered with tar paper and equipped with electric lights, phonographs, the latest magazines, and radio sets, that have replaced the picturesque log camps of former days.

Although the twentieth-century lumberjack is pretty much the same kind of a man that he was thirty or forty years ago, when logging was at its zenith, he has been surrounded by the comforts of civilization, and, as a type, is rapidly disappearing, like the forests he loved, before a machine-made civilization.

Stalwart, powerful, self-reliant, bold, he is the same masterful man of the woods as of old, juggling with death a dozen times a day, tugging and straining with his peavey under a tangled wall of timber, behind which presses the full power of a spring freshet, jumping with the agility of a cat from one bit of unstable timber to another when the first sharp crack warns him that the mass is about to break down on him like a wave on the shore.

With quiet, humorous eyes that smile a challenge, and movements as quick and certain as a panther's, he still rides logs down rapids where loss of balance means injury or death under some following battering ram, and pries at key logs in the rollways on the banks of a stream, until the whole pile begins to rattle down like a cascade, forcing him to jump, ride, or even dive, to safety.

But as forests are turned into miles of dreary stubble, the ranks of the old-time woodsmen are thinning and the days

SPLITTING FALLEN MONARCH OF THE FORESTS

After It Is Down, the Hemlock Giant is Divided by the Spreader and Cut into Smaller Logs That Are Easier to Transport to the Railroad Siding for Shipping

when the "gang" boiled into some little lumber town on a "jamboree" are gone forever.

Having proved his ability to work untiringly in great extremes of temperature, to master the science of "felling" trees so they will not damage those still standing, or shoot down mountain sides, the man who bears the proud, but ugly, name of "hick," looks with scorn on the clumsy alien laborers who follow him and cut out the small "paper" wood after the hemlock, birch, maple, beech, and poplar trees have been disposed of.

While cutting methods have changed greatly in the past score of years, the lumberjack must still be able and willing to find his place in the forests on dark winter mornings when the thermometer is down to 30 degrees below zero. Two of the oldest of hand tools, the wedge and the ax, are still leading devices in his art. It is true that the crosscut saw has taken over some of the duties of the ax, but, nevertheless, the latter is quite as necessary as it ever was.

There are two methods of felling trees—with the ax alone, or with the ax and crosscut saw. Power-driven machines for felling trees have been invented, but while these are more or less successful in the actual cutting, the trouble lies in transporting them to the spot where the work is to be done, which is often in the midst of heavy underbrush or at great distances over uneven ground, making it difficult, if not impossible, to move a power-driven device.

One of the most interesting operations is always the felling of trees. If a saw is to be used, the first step is to make a wedge-shaped notch with the ax on that side of the tree looking in the direction in which it is desired to have it fall, the lower cut being horizontal and the upper at an angle of 45 degrees. This not only directs the fell of the tree, but also prevents the trunk from splitting.

After the notch has been made, the cutting with the saw is started on the opposite side and a few inches higher. Swaying rhythmically, with sleek muscles rippling under their woolen shirts, two lumberjacks direct the blade.

"Wedge it!" comes the cry from one of them a few minutes later, and a wedge is driven in behind the saw to keep it free from the weight of the tree.

"Z-z-z!" the song of the saw continues.

Then there comes a warning "crack," followed by the shrill cry of:

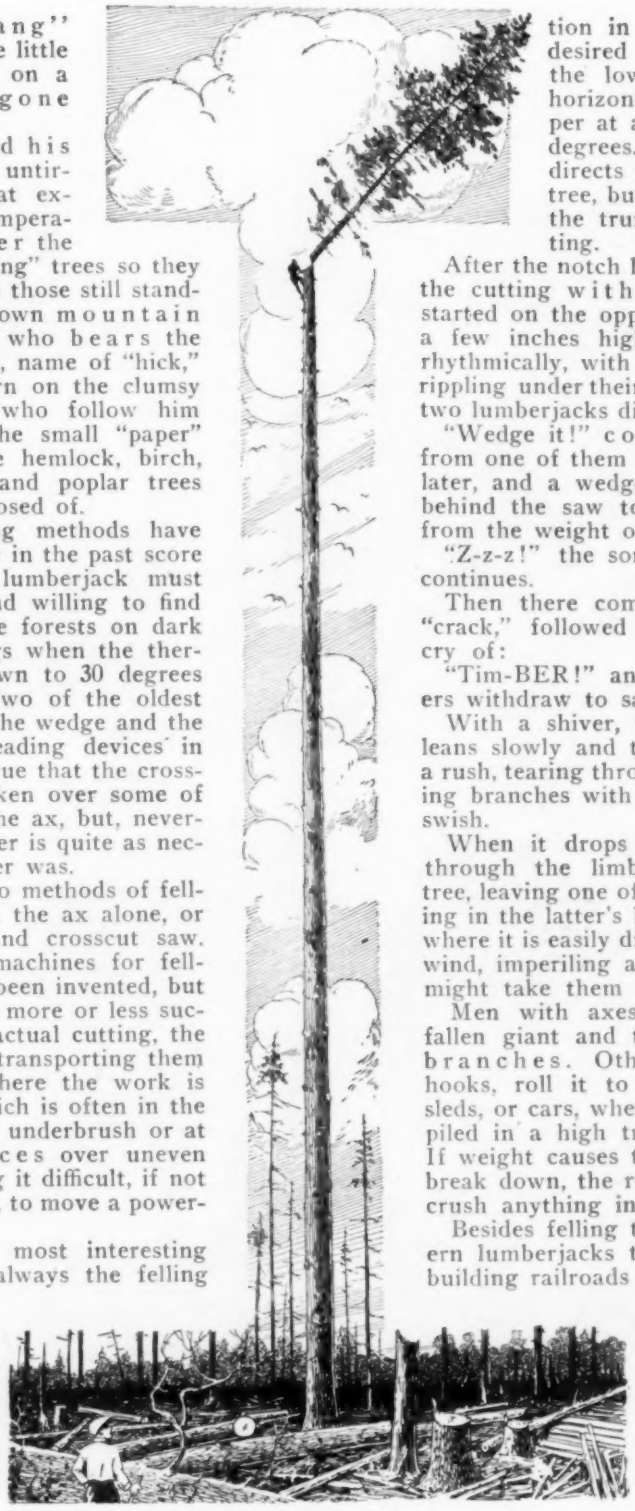
"Tim-BER!" and the swampers withdraw to safety.

With a shiver, the great tree leans slowly and then falls with a rush, tearing through surrounding branches with a tremendous swish.

When it drops it may crash through the limbs of another tree, leaving one of its own hanging in the latter's branches, from where it is easily dislodged by the wind, imperiling all whose work might take them in its vicinity.

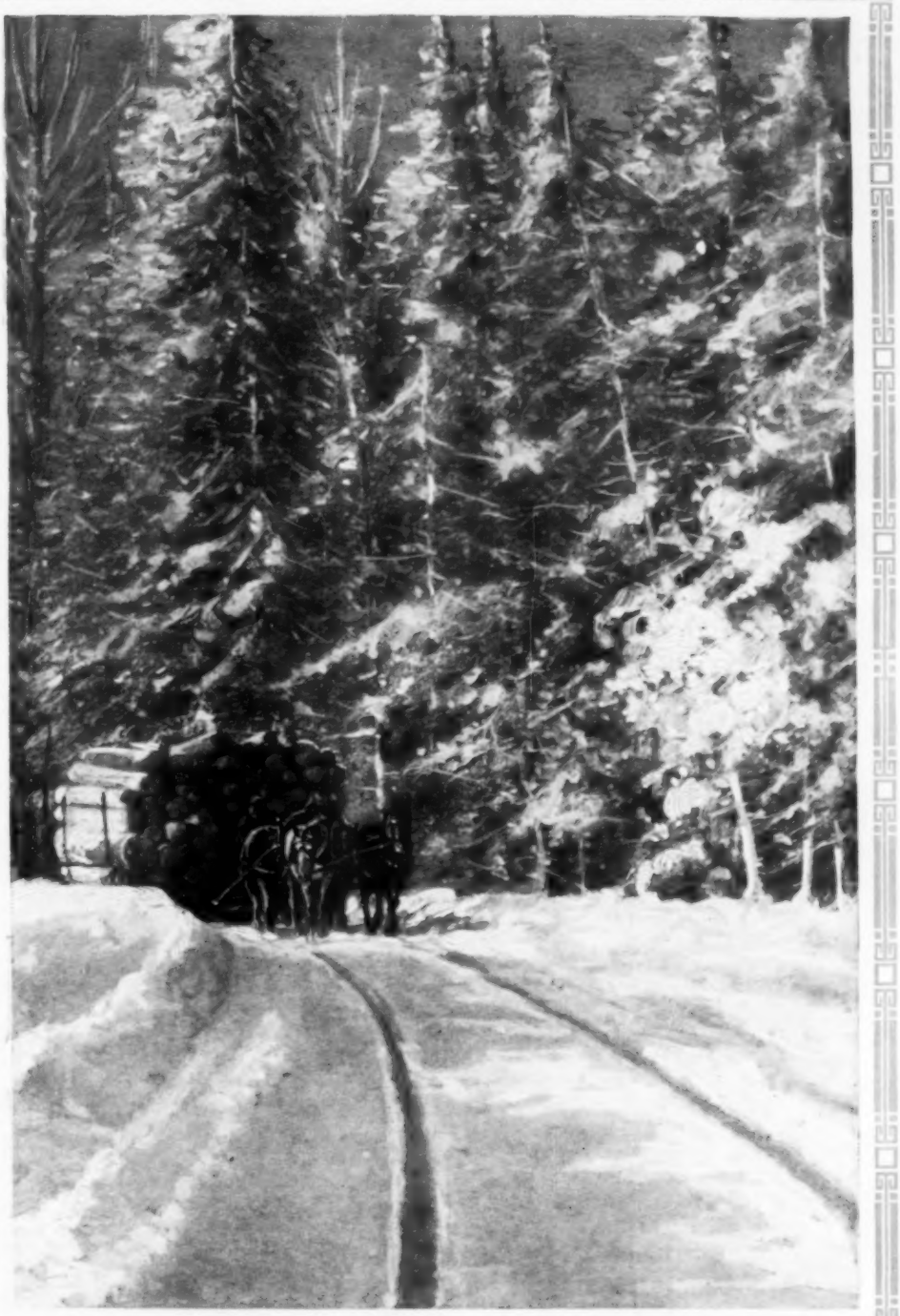
Men with axes leap on the fallen giant and trim away the branches. Others, with canthooks, roll it to the skidways, sleds, or cars, where the logs are piled in a high triangular peak. If weight causes the pyramid to break down, the rolling logs will crush anything in their paths.

Besides felling trees, the modern lumberjacks take a hand in building railroads through the forests, as well as cutting paths for the teamsters. "Swampers" clear the roads and the way to the logs as they lie in the woods.



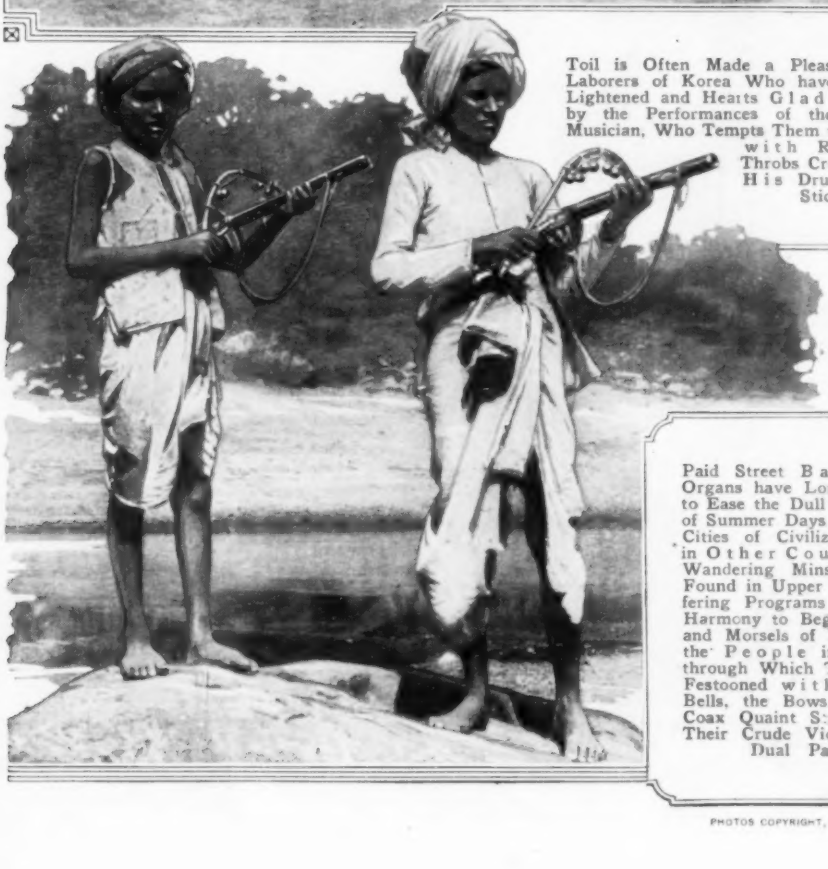
"Topping the Mast": Master Woodsman Bringing Down the Top of a Giant Tree—a Perilous Task Requiring Nerves of Steel

SLEDDING LOGS BENEATH SNOW-LADEN TREES



"Hi! Yup!" Echoes the Cry of the Teamsters on Frosty Mornings through Thickets of Birch and Balsam, While the Ring of Axes Makes Merry Music in the Clearing

Toil is Often Made a Pleasure for Laborers of Korea Who have Tasks Lightened and Hearts Gladdened by the Performances of the Hired Musician, Who Tempts Them to Speed with Rhythmic Throbs Created by His Drum and Stick



Paid Street Bands and Organs have Long Helped to Ease the Dull Monotony of Summer Days in Stifling Cities of Civilization. As in Other Countries, Wandering Minstrels are Found in Upper India, Offering Programs of Weird Harmony to Beguile Coins and Morsels of Food from the People in Villages through Which They Pass. Festooned with Jangling Bells, the Bows, Used to Coax Quaint Strains from Their Crude Violins, Play Dual Parts

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From Tom-Toms to Jazz, Music's Magic Lure Is Traced Through Ages

Scientists Follow Its Evolution Before the Dawn of History to Explain Fascination Rhythm Has Held for the People of All Races Since the Beginning of Time

"IT'S the voodoo!"

As the words were uttered, the sob of a violin, the cry of a clarinet, and the blare of a saxophone echoed through the great hall—paused an instant—and then, with a crash of cymbals, rushed together into the latest jazz dance.

Rubbing his eyes, the speaker, a scientist recently returned from abroad, gazed about him at the swaying figures, while memory took him back to the mysterious forests surrounding Port au Prince in Haiti where the murmuring night wind brought the sound of a drum, beating like a great, tireless heart.

Sometimes fast, and then again, more slowly, the rhythm rose and fell like the pounding of an invisible pulse telling of strange rites being performed by dark shadows flitting about the embers of dying fires — the dread voodoo from whose shackles civilization has been powerless to free the natives.

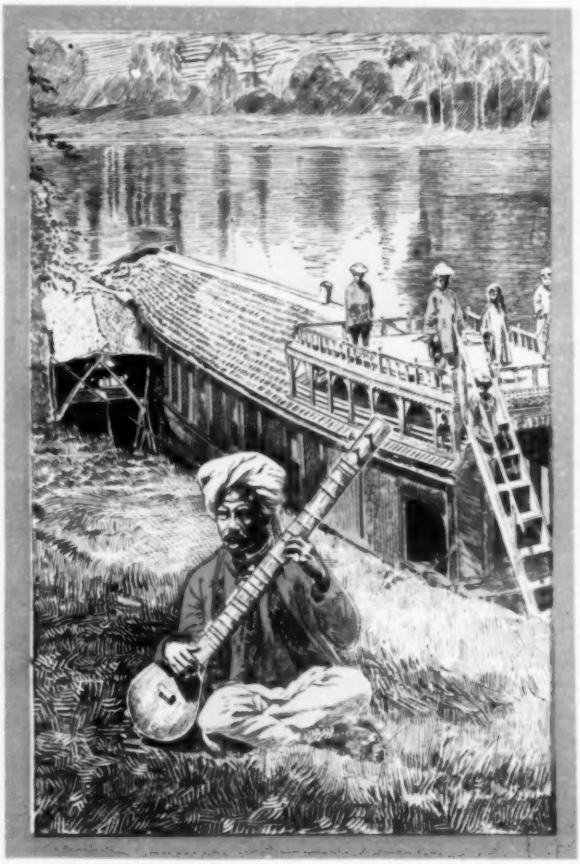
Strangely like the jazz music found in the dance halls and centers of culture today — perfect rhythm without much melody—the note of the tom-toms has been traced back to the ages before the dawn of history by scientists seeking to explain the magical lure it has held for the peoples of all races.

First of all musical instruments, the drum is believed to have been the result of early man's effort to imitate the pounding of his own pulses by beating on a hollow log with clubs. In the wilds, however, great gorillas challenge their enemies to combat by standing erect and striking on their chests.

In nearly all primitive lands the drum is to be found in some form. Often it is an empty gourd tapped with a stick or a hollow log, over the ends of which dried skins have been stretched. In Africa, parchment placed over wooden kettles and struck with clubs serve to arouse various tribes. Hollow poles of varying lengths that are hammered with bamboo rods also are used.

With the beat of the drum as the underlying motive, other sounds are produced by wind instruments and by stretching cords of dried skins to poles of various forms. One of the earliest of such devices is a flute made of a bone of a giant elk and found in a prehistoric cave in France.

In the East Indies, musicians perform on crude types of fiddles that give forth soft, droning notes, accompanied by the jangling of bells festooning the rough bow drawn across the



Popular Melodies of Hindu Boatmen are Sung by Native Minstrels to the Twang of Banjolike Instruments

strings. There also is found a sort of banjo, having a fingering board marked with ridges by which various notes and tones are produced, as well as many other instruments.

In Korea, land of the hermits, native laborers are often inspired to greater efforts by the music of a drum beaten by a hired player who stands in their midst as they toil. Chinese celebrations are usually attended by bands equipped with grotesque horns, cymbals, and stringed boxes.

In whatever form it is found, primitive music seems to hold its hearers under hypnotic spells, arousing within them strange responses to its weird harmony. The so-called "jazz" strains lately written into the popular songs of the western world, by many are supposed to have been copied from the jungle orchestras of Africa, where native dances done to the rattle of pot drums and shrill pipes, mark barbaric tribal feasts and councils.

Digging into ruins of ancient cities, scientists have found many queer musical instruments, resembling some of those in use today. The gong was employed by early Romans in their households and to mark time for the feet of marching legions. The lyre, a harp-like instrument, said to have first appeared in old Babylon, later was used by the Greeks to accompany songs and recitations of poets.

While the familiar piano is a development of recent years, its sounding board received its beginning in the earlier forms of the harp which were well known in the hands of ancient peoples. Grind organs now played about the streets of large cities are believed to have found their origin in the hurdy-gurdy, a stringed affair, played by having a small wheel of pins turned against rosined threads.

Not long ago it was discovered that stringed musical devices, believed to have originated in Europe during the middle ages, really came from the lute, an instrument of the Egyptians, made by stretching silken cords across a hollow pear-shaped vessel, and picked with a piece of shell or quill. In Japan and eastern Asia many forms of flutes were known to have existed centuries before Christianity.

South Sea islanders, by inserting rude wooden mouthpieces into the ends of seashells, cause them to give forth sharp sounds that often are heard for miles across the waters, while guitars have been familiar for years to the natives of Hawaii, their softly thrummed notes picturing the languorous lassitude of the tropics. Although many of these instruments are strange to civilization, they all lend sound, harmony, and a means of expression to the people who wrought them.

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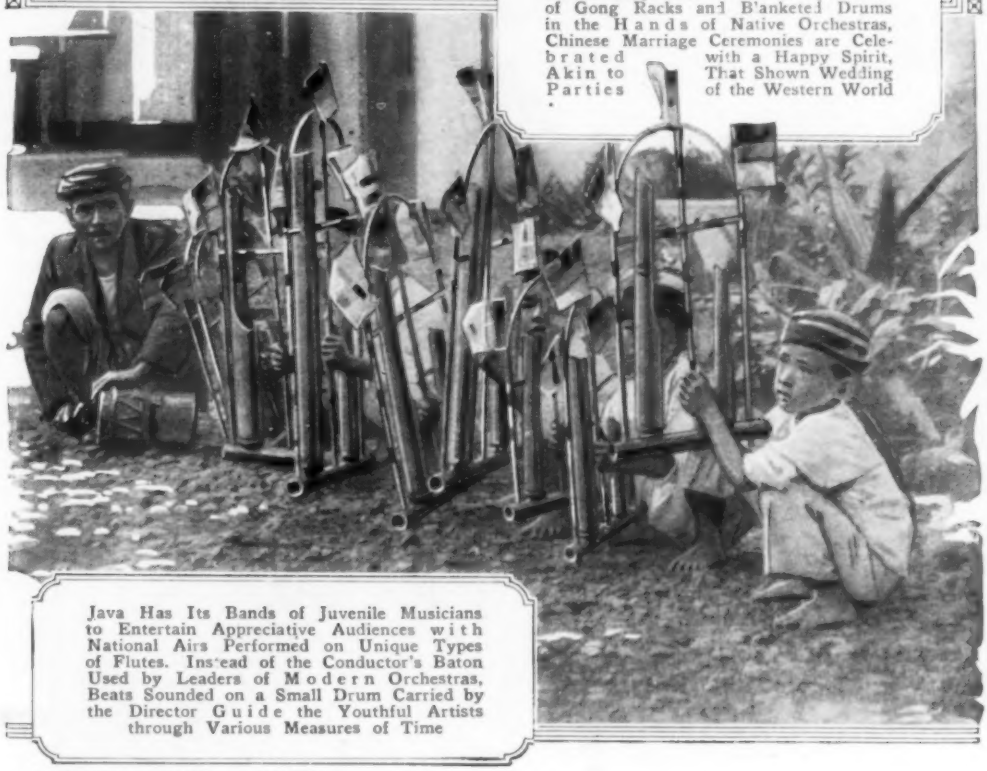
Village Musicians of Northern India Play on Crude Fiddles Whose Notes Resemble Those of the Modern Violin. The Strings are Twisted Cords, Heavily Rosined.

Aided by every advance of science, the making of modern musical devices has reached a notable degree of perfection. One factory alone turns out 3,500 band instruments of the finest quality every month.

These are the result of the combined skill of thousands of workers, long years of laboratory research, and plants filled with ma-

Serenaded by Blatant Notes of Peculiar Horns Played to the Accompaniment of Gong Racks and Blanketed Drums in the Hands of Native Orchestras, Chinese Marriage Ceremonies are Celebrated with a Happy Spirit, Akin to That Shown Wedding Parties of the Western World



Java Has Its Bands of Juvenile Musicians to Entertain Appreciative Audiences with National Airs Performed on Unique Types of Flutes. Instead of the Conductor's Baton Used by Leaders of Modern Orchestras, Beats Sounded on a Small Drum Carried by the Director Guide the Youthful Artists through Various Measures of Time

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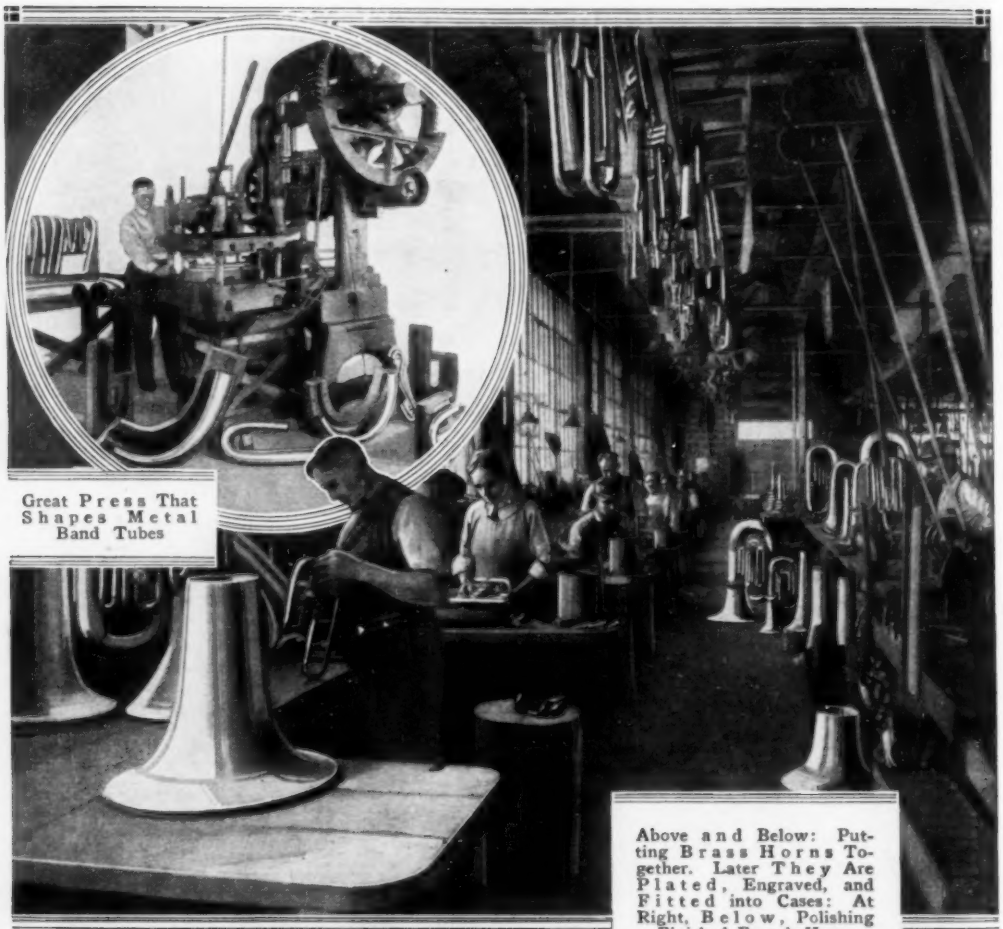
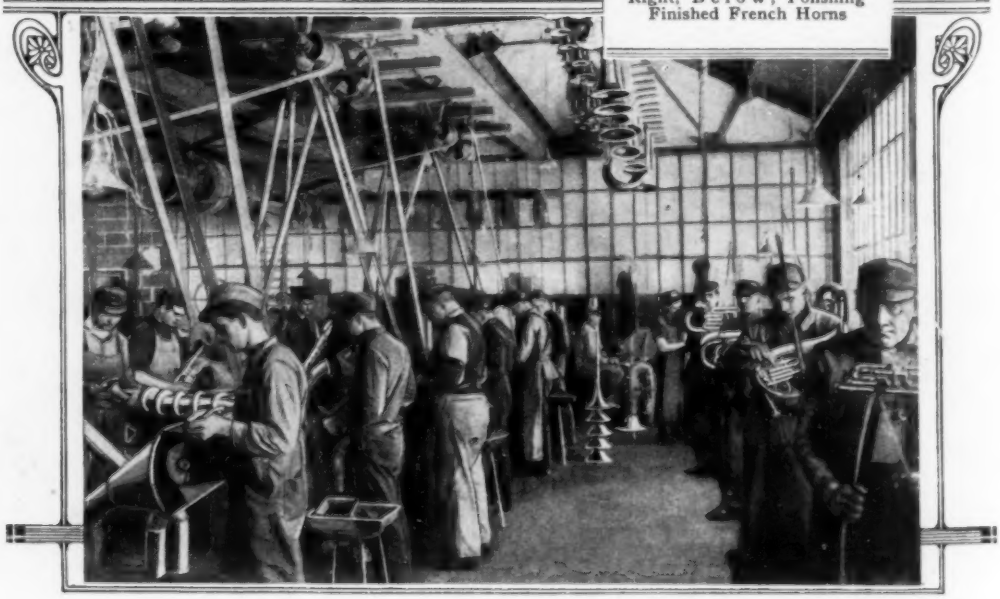
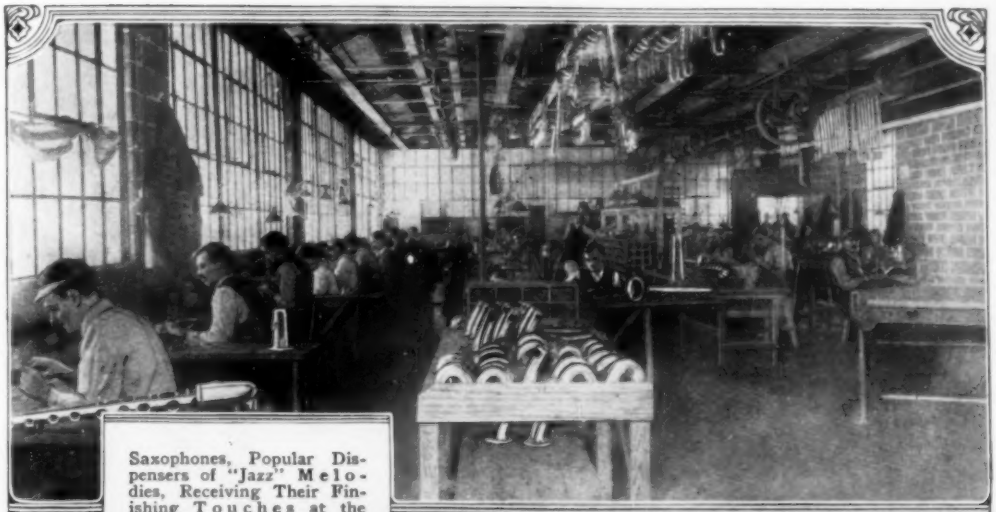


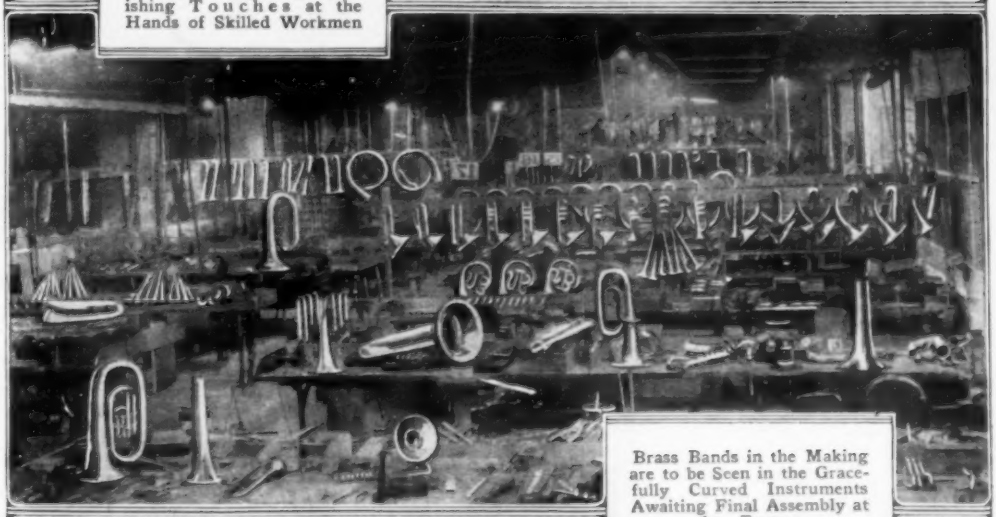
Great Press That Shapes Metal Band Tubes

Above and Below: Putting Brass Horns Together. Later They Are Plated, Engraved, and Fitted into Cases: At Right, Below, Polishing Finished French Horns

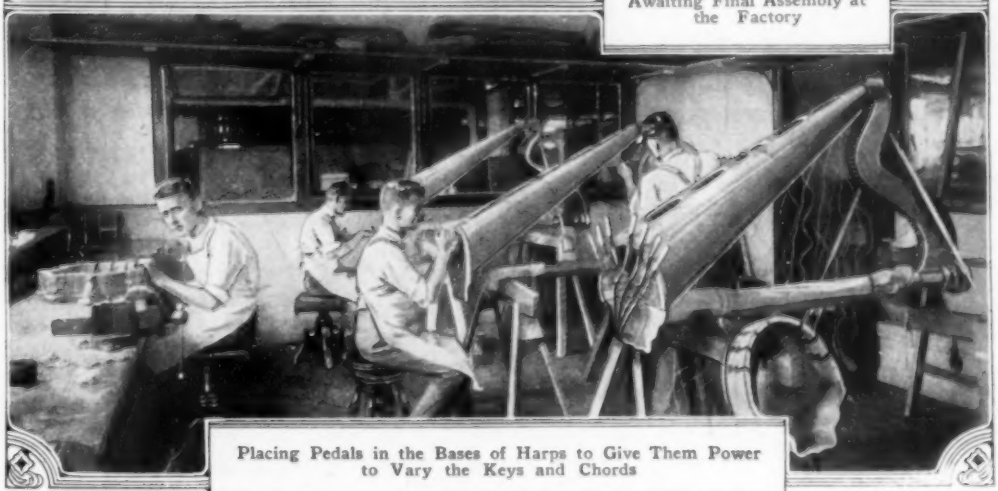




Saxophones, Popular Dispensers of "Jazz" Melodies, Receiving Their Finishing Touches at the Hands of Skilled Workmen



Brass Bands in the Making are to be Seen in the Gracefully Curved Instruments Awaiting Final Assembly at the Factory



Placing Pedals in the Bases of Harps to Give Them Power to Vary the Keys and Chords

Strange Indian Rites Recall Glory of the Old Frontier Days

TRADITIONS of frontier-days' glory were recalled and the centuries-old rites of a vanishing race were revived at a Navajo Indian ceremony in the West recently.

For a few brief hours the barriers of civilization were swept aside as thousands of moccasined feet beat time to the plaintive chants of the medicine men.

Moving about the smoking camp fires like grotesque shadows, painted braves in feathered headdresses mingled peacefully with a little group of scouts of the Santa Fe trail, companions of "Kit" Carson and Buffalo Bill.

One, limping on crutches under the weight of 90 years, bore the scar of a scalping knife all the way around beneath his long hair, and was pointed out by his companions as Dan Du Bois, the hero of untold frontier adventures.

For what was said to be the first time in history, the Indians had gathered to bless the opening of a white man's dwelling with the same solemn rites attached to the dedication of their own "hogan."

Sand Painting of Arrow Man Has Religious Meaning

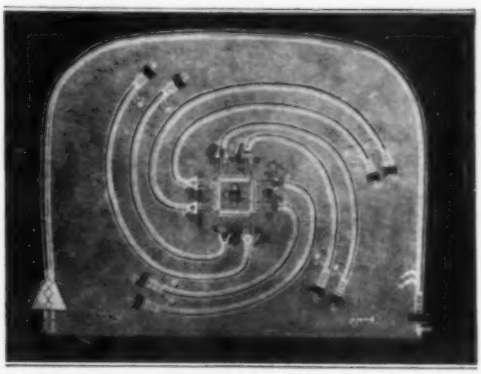
Fifteen medicine men, the high priests, physicians, singers, painters, and dancers of their race, were the leading actors in the services that marked the opening of the structure, a railway hotel.

Old men these priests, with grizzled hair, bent with years, but active in the weird dance. Like the bards of old, they depend upon the memory for details and teach the cult in turn to their followers. Their paintings, many of them made with sand, are said to rank with the best decorative art of any people, and are reminiscent of Assyria and Egypt, of Greece and Japan. Every line is a religious symbol, having a significance.

While scientists have written of these works of art, novelists have woven them into stories, and every student of Indian lore knows more or less about them, few "palefaces" have ever actually beheld them, because they are serious records of the Navajo's religious faith, and the secrets of their design and composition have been carefully preserved.

During the "blessing-of-the-house" ceremony, many of these sand paintings were made.

After the evil spirits had been expelled from the home, there were no references to any evil spirit or thing. Instead, all that is good and beautiful and perfect was invited to take possession of the dwelling and its occupants, leaving no room for the evil spirits to return.



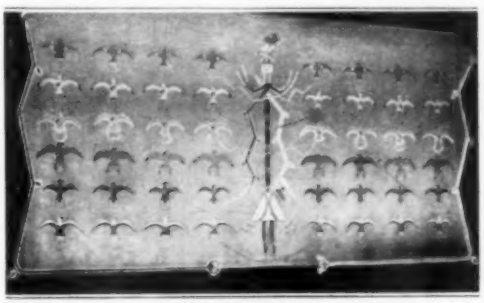
Nat-Sil-Id-Iy-Ishi, the Rainbow, Whose Design was Carried through Ages in Minds of Medicine Men

Hash-kay Yashi, Oldest Medicine Man of Navajos, with Last of Frontier Scouts

In the opening chant, which is sung during a procession by the medicine men, there is a prayer to the "Unnamed God" — the "one Spirit," of whom the numerous gods of the Navajo are merely various manifestations.

In the sand painting, a field of white is first spread. Then the coloring and drawing are done with marvelous dexterity by spreading colored sands outlined with almost penciled delicacy and great accuracy. One of the traditional requirements is that the painting must be completed between sunrise and sunset. Medicine men, depending entirely on memory, direct the work. As soon as the paintings have served their purpose, they are destroyed. Among members of the tribe no one is allowed to copy the figures.

A person or patient requiring prayers is seated on the sand painting. Part of the ritual consists in destroying the design by rubbing color on the patient. To make the treatment effective, the medicine man must receive some gift for his services in averting evil, curing sick, or petitioning for unusual blessings.



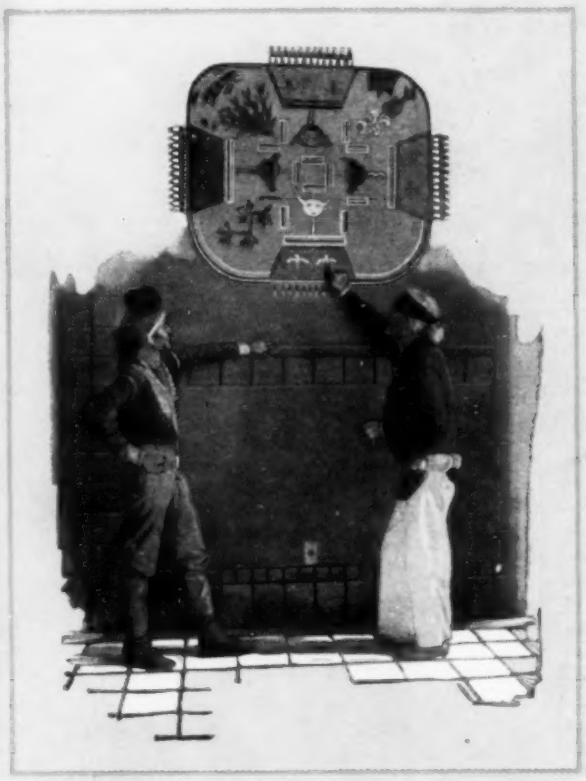
Design of the Rainbow Made by Spreading Colored Sands on a Field of White

Various ceremonies are used with the sand paintings. When the sand is not practicable, dry paintings are made on buckskins, but the figures are identical. There are hundreds of designs covering nearly every human ill and joy, representing prayer, blessing, faith, hope, and charity, protest, and many other elements.

Authentic copies of the more commonly used were placed in the white man's home, a flattering tribute to the friendship that has developed between the Indian and his neighbors. One called "The Day" is used in the buffalo chant,

a ceremony so old that it has almost faded from the memory of the oldest priests. A chieftain, 110 years old, described this to the visitors.

A throng gathered for the event because it was so unusual for Indians to stage the sacred housewarming for members of another race. Some said that it would never again occur because, though the tribe numbers 32,000, the old medicine men are dying off, and these ancient ceremonies may pass away with them.



Aged Chieftains Examining a Painting Called "The Day," Used in a Chant So Old It Has Almost Faded from Memory

At the blessing two old men, who, years ago were engaged for many months in persistent efforts to shoot each other, sat quietly together while they were photographed. They were Du Bois, the last of the frontier scouts, and the oldest living medicine man of the Navajos, Hashkay Yashi, who was war chief of his people in their final outbreak during the Civil War.

Du Bois and Carson rounded up the rebelling Indians and corralled them in a military stockade until the final peace pipe had been smoked. Then the Navajo went to his reservation.

Opening of the white man's home with the picturesque ceremony recalls the curious religious ideas of these Indians. They believe that everything is some person, alive, thinking, and willful. Fish, birds, beasts, and inanimate objects they regard as possessing spirits. To them, all things are of the same nature and are accorded respect and honor in the pictures.

How they call on the spirits through sand paintings to bring better crops is typical. Plots of ground are burned, trees girdled, and seeds planted by pointed sticks. The first year the crop is free from weeds. The second year the yield is small, and the third year it is abandoned after a futile appeal to the spirits by the farmer as he kneels on a sand painting. Instead of using his own resources in properly cultivating the land, he moves to a new field. The Indians believe that spirits bring rich or lean crops according to their whims, when addressed through medicine men and paintings.

"Eagle Trap," Sand Painting for an Indian Ceremony

Ceremonies on various occasions are held for one purpose—to impress their old friends in the other world, which is the reason the medicine men were so anxious that the white sponsors at the housewarming correctly repeated chants word for word. An imperfect ceremony might give evil a chance to enter.

GRAIN CAVERNS IN OLD FORT USED AS MARKET

Built centuries ago as a storing place for grains during sieges, great caverns still exist beneath the fortifications of Valletta, the capital of Malta. The place where they are located is now used as the city's marketing place. Standing in the central channel that connects the eastern and western basins of the Mediterranean, the island, even before the Romans attained their pinnacle of power, was a much prized possession. For hundreds of years it was the battleground of many races, and, as a matter of course, came the grain pits for protection against famine during war, since the island has always depended upon other countries for grain. Within these wells can be stored an enormous amount of cereal.

Removing Grain from Deep Pits Built Centuries Ago in Courtyard of Fortress to Serve as Warehouses in Times of Famine, but Which are Now Used for Storing Cereals for Market

DREAM OF A RADIO EMPIRE TO LINK WHOLE WORLD

Within a few months, a chain of powerful wireless stations circling the globe is expected to be in operation, enabling a person in London, for instance, to communicate daily with individuals in Peking, China. Necessary licenses have been obtained by Marconi, the famous radio engineer, who has linked London with New York, a distance of 2,920 miles, and is in daily touch with Glace Bay, 1,906 miles away, and Montreal, 2,700 miles distant. The link is being extended to Winnipeg, Edmonton, and Vancouver, thence to Peking (4,630 miles), and Melbourne (7,300 miles). Another route planned is by way of the Azores, Madeira, and Cape Verde to Buenos Aires, and from there to Punta Arenas, near Cape Horn. From Great Britain there is yet another line joining South Africa with Nairobi, proceeding to Madras, Rangoon (Burma), and Hongkong. When the last of the wireless lines is completed, it is said that every portion of the British empire will be able to communicate easily with every other state or colony.

DIAMONDS MADE FROM SUGAR

Lumps of sugar may be converted into diamonds, according to those interested in the experiments, by first separating the carbon from other substances they contain. The gems thus produced are said to be too small for commercial purposes, but will withstand all tests usually applied to detect the real article.

How Ancient Empires Built of Bronze Were Overthrown by Iron Age

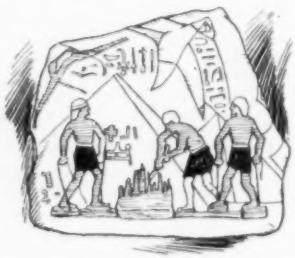
DISCOVERIES made by scientists delving in the ruins of ancient Babylon have drawn attention to the little-considered fact that an empire — then a world power — flourished more than 4,000 years ago without iron enough to build a modern battleship.

When the treasures found in the tomb of King Tutankhamen were brought to light, after lying untouched for 300 decades, many articles of bronze were found, recalling the claim by many historians that iron in the form of weapons in the hands of enemies, caused the downfall of the Egyptian civilization.

And yet, 1,000 years before King "Tut" was born, iron was fast coming into use in other, and in some cases, less civilized parts of the world. China and India were employing it for tools and weapons. First it was used in warfare. The rise and expansion of the Assyrian empire came on the crest of the first wave to mark the beginning of the iron age.

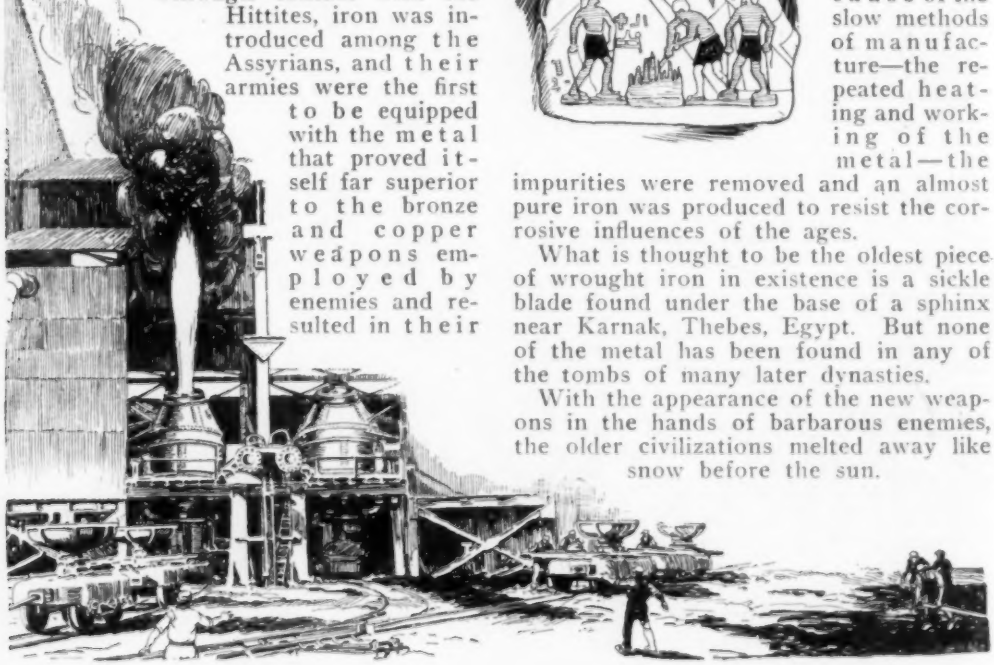
Through contact with the Hittites, iron was introduced among the Assyrians, and their armies were the first to be equipped with the metal that proved itself far superior to the bronze and copper weapons employed by enemies and resulted in their utter defeat. That the Egyptians obtained iron from the Hittites is recorded on a clay tablet written about 1250 B. C. by one of the barbarian rulers who mentions that he was about to send a shipment of "pure iron" to Rameses II, who had asked for it, and that in the meantime an iron sword was being sent to the Egyptian king as a gift. While the Hittite civilization was lower than that of the Egyptians, the nation made up for its lack of culture by serving as the world's ironmonger.

It is a tribute to the labor and skill of the early iron men, that there remain today a few samples of prehistoric weapons and tools. Because of the slow methods of manufacture—the repeated heating and working of the metal—the impurities were removed and an almost pure iron was produced to resist the corrosive influences of the ages.



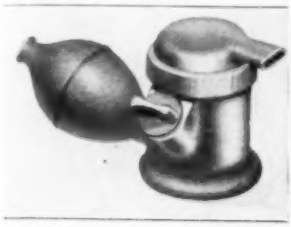
What is thought to be the oldest piece of wrought iron in existence is a sickle blade found under the base of a sphinx near Karnak, Thebes, Egypt. But none of the metal has been found in any of the tombs of many later dynasties.

With the appearance of the new weapons in the hands of barbarous enemies, the older civilizations melted away like snow before the sun.



PRESSURE ON BULB SPREADS SHAVING LATHER

By pressing the rubber bulb of a lather-making device, soapy foam for shaving, which it forms, is forced through a flat nozzle, and spread without need of a brush. Made to fit the hand, of light, nonbreakable materials, it may be used in the home or barber shop, or carried by the traveler. Having few parts to gather dirt and germs, it is sanitary and does not require sterilizing. Soap is supplied to it in small tablets.



CLOTH IS MADE MOTH PROOF WITH ODORLESS LIQUID

Garments of moth-proof cloth are now being manufactured, guaranteed to resist the ravages of the insects during the life of the fabric, as a result of the discovery of a liquid disinfectant that not only kills the pests but destroys their eggs as well. For household use, the chemical is dispensed in bottles equipped with a plunger that works like an atomizer. Stainless, odorless, and noninflammable, it may be applied to the most delicate fabrics without causing injury.

Household Dispenser for Spraying Clothing with Moth-Destroying Liquid

FIFTY THOUSAND PHOTOS A DAY WORK OF TWO MEN

Doing more work than 50 expert photographers can accomplish, two machines recently imported from Europe make more than 50,000 completed photographs in a day. Blank paper is fed into one end and finished pictures are delivered from the other. Prints are made directly from the negatives and then are developed, washed, and cut into desired shapes. Photos of various sizes can be made at the same time. The machines also can print typed inscriptions on the backs. The devices, each of which can be operated by one person, are used in a dark room so the light cannot reach the highly sensitized paper.

Actual Photographs on Back of Letterhead Used to Carry Writer's Message

THOUSANDS OF GEESE KILLED FOR HOTEL'S PILLOWS

In furnishing a modern hotel recently erected, 37 miles of carpet were laid on the floors of the guest rooms and corridors, while 25,000 pounds of horsehair were used to stuff the bed mattresses. To obtain 7,000 pounds of feathers and down for the pillows, 90,000 geese were killed. If this number of living fowls were formed into columns four abreast, the line would be two miles long. Marching in "goose step," at a normal speed, the host would be 3 hours and 41 minutes passing a given point.

HUNDREDS OF ODD REMEDIES FOUND IN OLD BOOK

Cataloguing the Almost Priceless Collection of Books and Manuscripts, Regarded as the Greatest Jewish Library Ever Assembled

INCLUDED in a library of 40,000 books and 4,200 manuscripts recently assembled at a Jewish theological institute and termed the most complete collection of early Jewish literary efforts, is a volume of notes of a physician who practiced about 1400 A. D., listing 1,300 prescriptions popular at that time.

Just how much medical science has advanced since then can be determined by the then accepted cure for a scorpion's bite:

"If a man who is riding a donkey is bitten by a scorpion, turns around and faces the donkey's tail, the pain will leave him and go to the donkey." The author, known only as "Abram," also noted that "Arabic women were used to cleaning their teeth by using the bark of a young nut tree upon which no fruit had been borne. They rubbed their teeth to prevent pain, and to keep them white."

The cure for earache in those days was to "take the fine roots of an olive tree and cook them in water and keep your ear over the steam that issues forth."

Depilatories, however effective, were not unknown, for the book lists the following: "To stop hair from growing: Take the fat of a hare and the marrow of its bones and anoint the shaven place." For safety in traveling, the physician recommended the carrying of the right eyes of 20 geese, a sure protection against robbers. The remedy for sleeping sickness was to place the tooth of a black dog under the sufferer's pillow.

Written in Hebrew and on thin parchment, the notes can hardly be read even with a strong glass. Other volumes, some of them dating back to 640 A. D., are of great worth because of their historical value. Writers of volumes during the inquisition period, at the peril of their lives, set down royal decrees signed by King Ferdinand and Queen Isabella of Spain, and by the Grand Inquisitor of the Ancient Emperors of Austria.

¶ Difficulties of carrying on a conversation in a moving train or in a subway can be eliminated partly if the person being addressed will close his ears with the finger tips. Without pitching his voice above the ordinary tone, the speaker then may be heard plainly, despite the conflicting noises.

PEARLS "PLANTED" IN OYSTERS DETECTED BY LIGHT RAYS

Pearls formed by inserting particles of hard matter into the shells of living oysters can now be detected by holding them before strong light, according to reports of investigators. Those built around a piece of mother-of-pearl are rotated on a string before a window or in the sunlight, when the sheen cast by the core can be plainly seen in certain positions. Another test is to place it over a hole bored in a thin sheet of metal, and held to the light. The shadow of any foreign substance on the inside of the gem will be outlined. Sometimes a small pearl of inferior value is used as the center of one "grown" in the oyster's shell. To recognize these, a gold wire is melted to create a tiny ball at its end, forming a small mirror, which is thrust into the beading hole of the jewel. The reflection of the dividing line between the two materials can then be seen with the aid of a magnifying glass.

CONQUEST OF MOUNT EVEREST SOUGHT WITH OXYGEN

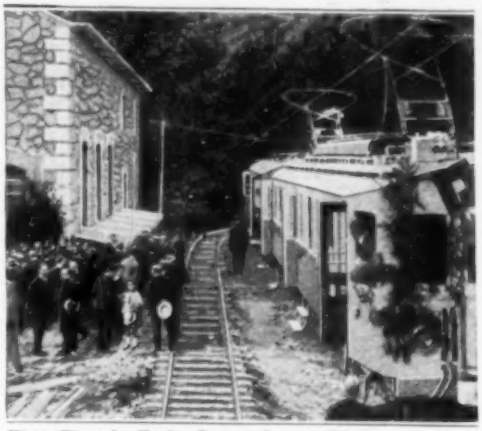
In a new effort to conquer Mt. Everest, British and American explorers have combined, and will employ an oxygen apparatus in an attempt to reach the top of the peak next year, it is announced. The device, which will be depended upon to supply proper air to the climbers, is now being tested in the Alps. The extreme altitudes make breathing difficult.

ADJUSTABLE CHAIR LEGS ADD TO WORKER'S COMFORT

Chairs with adjustable metal legs have been designed to add to comfort and increase efficiency of the worker. Any change in height from an inch to a foot is made possible by sliding the legs and bolting them to the frame. By altering to suit the individual worker, the chairs relieve the strain resulting from being seated too high or too low at a table or desk.

PEAKS OF SPAIN CONQUERED BY ELECTRIC RAILWAY

Steep, forest-covered slopes of the mountains near Madrid, in Spain, can now be reached by electric railway, built



First Electric Train Operated over Picturesque Road in Mountain Range of Central Spain

along a picturesque right of way. The first train was run over the new road recently. Specially designed, bow trolleys, with which the cars are equipped, hold firmly against the feed wires, while passing at great speed around the sharpest curves.

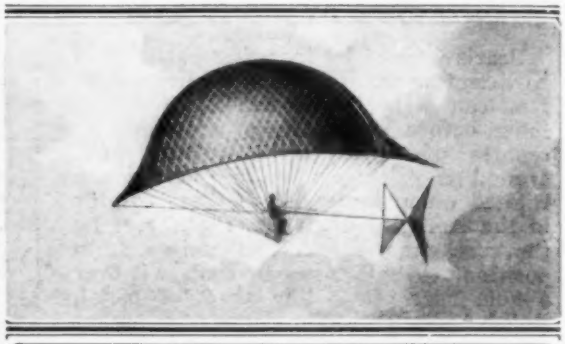
ELECTRIC XMAS-TREE LIGHTS CLAMP ON THE BOUGHS

Tiny electric lamps that clamp on Christmas-tree branches are being made to eliminate danger of fire. They are made in various colors and are scarcely larger than a match head, giving the light of about a single candle. Only a small amount of current is required to light them, and this is supplied either by a storage battery or from a lighting fixture. As the bulbs last for a long time without burning out, they may be stored away.

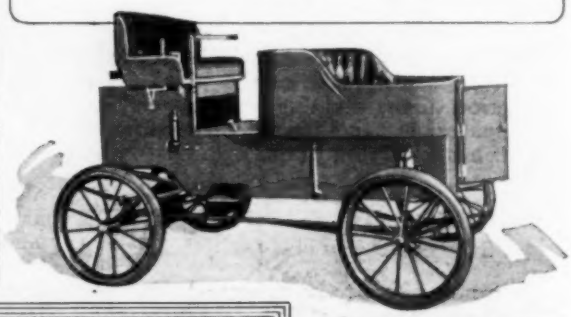
¶In a little more than two years, a tightly sealed bottle floated westward across the whole width of the Pacific Ocean, a distance of 8,400 miles in a direct line from Central America to New Guinea. It is estimated that the bottle would have had to travel 11 miles every day, if it took the shortest route.

"Marvels of Science" Twenty Years Ago

"The Automobile's Successor Is Here," Asserted a Writer in Describing a "New Electrical Vehicle," That Twenty Years Ago had Won "Societies Approving Smile and Presages the Reign of a New Wheeled Favorite."

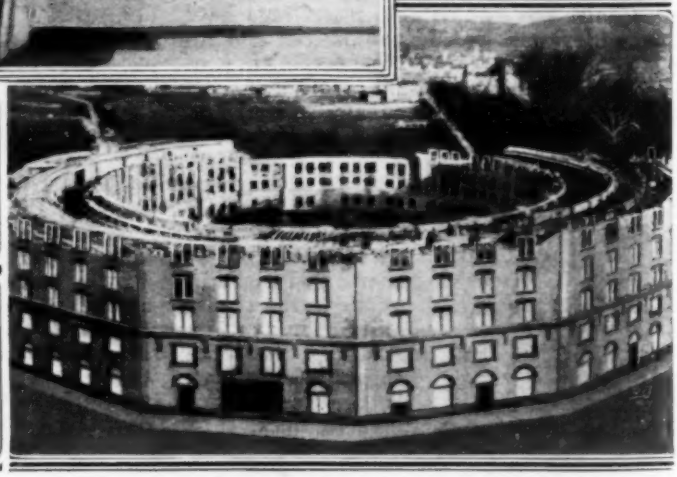


"Sky-Cycle," or Gas Kite, Built in 1902 by Carl E. Meyers on His Balloon Farm at Frankfort, N. Y.



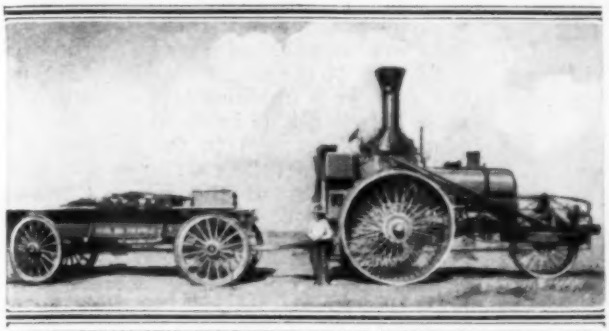
Described as First Vehicle Ever Built to Run Either on a Track or Public Highway, This Automobile is Declared to Be Equally at Home in the Boulevards of a City or Mountainous Flights of a Railroad. Seating Seven Persons, It was Designed by W. S. Rogers, Keene, N. H.

In Discussing the "Future of the Wireless," Popular Mechanics Printed a Picture of Marconi and Said: "It may Link All the World So Closely That the People will Be Like Those of One City."

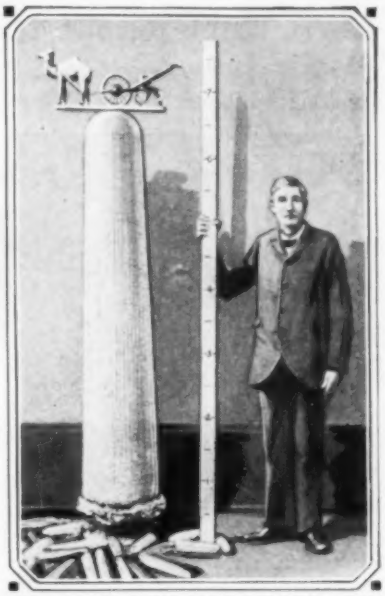


Hailed as the "Oddest Hotel in the World" the Construction of a Multi-Sided Hostelry was in Progress at West Baden, Ind. It Had an Oval Interior and was to be Crowned by a Huge Glass Dome.

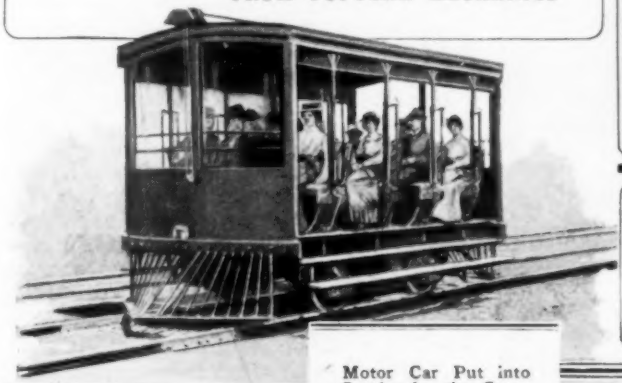
From the Pages of Popular Mechanics



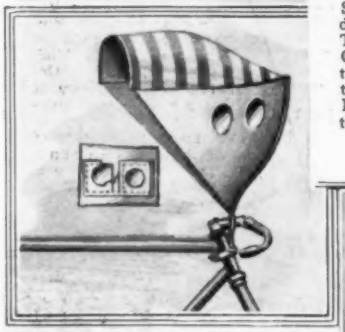
"Horses are Giving Way to the Tractor and Its Influence is to be Felt Even More in the Future"
FROM POPULAR MECHANICS



Ear of Corn, Seven Feet Long, Shown at the Cincinnati Vehicle and Implement Show in 1902: It was Not Grown, However, but was Made by Pasting 40,462 Grains in a Wooden Cob



Motor Car Put into Service by the Canadian Pacific Railway Two Decades Ago to Give Tourists a Better View of the Mountainous District about Banff Hot Springs in the Heart of the Canadian Rockies



"Now the Scorcher will Have No Excuse, for He can Carry It with Him All the Time," Said Popular Mechanics of a Bicycle Canopy That Had Holes for Air and View

"Great Steel Structures on State Street, Chicago," in 1902 Resulted in Arguments as to Whether They should be Allowed Because of Danger of Earthquakes and Corrosion of Steel Frames

HOLLOW LOG IS WIRELESS SET OF WILD JUNGLE TRIBES

Long before the first modern radio set came into being the wild South Ameri-

South American Indian Sending a Wireless Code Message from a Primitive Broadcasting Station

can tribes that live in dense forests and grass-covered plains near the equator, had "wireless" outfits made from the trunks of hollow trees. For years the jungle and tundra have echoed the booming of these huge drums. By means of code systems, each tribal chieftain keeps in touch with his people, calling his warriors, ordering raids against enemies, warning of marauders, or announcing the approach of strangers. The sound emitted by one of these instruments which, it is said, can be heard for many miles, is like the dull, distant boom of a cannon.

BIBLE CITY'S FATE IS BARED BY LINES ON CLAY BLOCK

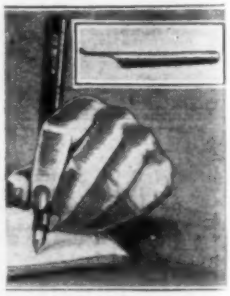
Dug up after 2,600 years, a clay tablet, covered with the writing of some ancient scribe, paints a graphic picture of the fall of Nineveh, famed city of the Old Testament. "Whoso loveth Nabu and Marduke, let him preserve this, and not suffer it to leave his hands," is the charge on the record, which goes on to tell of an attack on the city and of how a band of its defenders broke through the enemy lines and established a new kingdom on the banks of the Euphrates River. Since the two gods mentioned are associated with Babylon, it is believed that the text of the tablet refers to the actions of a Babylonian king. The writings also place the destruction of the city as having taken place in 612 B. C.

CHARIOT IN FLAMES IS INDIAN LEGEND OF METEORITE

What is a meteorite? Is it a treasure house of diamonds, or is it just a chunk of fused stone? To answer these questions, scientists have been studying for years one of the largest of these celestial visitors, which, they believe, fell during prehistoric times into Cañon Diablo, in Arizona. According to Indian tradition, it was a flaming chariot bearing three gods, who, enveloped in a sheet of flame, extending as far as the eye could reach, rode from the stars to the earth in search of eternal rest. Small diamonds have been found in the mass, together with many metals. The fragment is now infested with rattlesnakes and houses thousands of rabbits, which attract birds and animals of prey.

LEFT-HANDED FOUNTAIN PEN HAS TURNED-UP POINT

To fit the needs of left-handed writers, a fountain pen has been placed on the market with a turned-up point, designed to prevent catching and spluttering. It is furnished in fine, coarse, or medium stroke. As a result of numerous experiments, it has been found that different individuals have varying styles of holding pens and that an instrument which may be suitable for one is not satisfactory to another. Based on these tests, one company has developed nine different styles of points. There is the flexible nib for the stenographer, the medium for correspondence and general work, the fine, stiff point for the bookkeeper, the special fine point for the accountant, and the nib for clerks and salesmen who desire to make manifold copies.

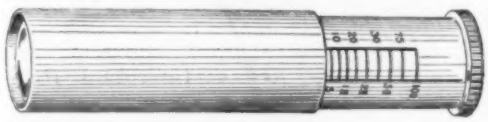


ANCIENT CITY OF DAVID'S SECRETS TO BE DUG UP

Within sight of historical Jerusalem, on a spot believed to mark the location of the ancient City of David, scientists have started excavations with the expectation of unearthing important relics of Biblical times. Whether the tomb of King David, from whom the early metropolis received its name, is located in the area to be explored is a question research has not yet settled. However, even though the sepulcher is not found, the experts are confident of digging up traces of the city's inhabitants. Early historians, although failing to mention the exact place of burial of the long-dead ruler, have recorded two robberies of his grave, one directed by Herod the Great, who had rich furniture, gold, and other articles removed from it.

VEST-POCKET RANGE FINDER AID TO PHOTOGRAPHERS

For amateur photographers, a device has been marketed, small enough to fit in the vest pocket, which correctly gives the distance of any object to be photographed within a few seconds, thus reducing the possibility of bad exposures. Pointed at the subject, the end is pulled outward until the image shows sharp on its "ground" glass. A scale on one side of the instrument indicates the number of feet. It can be used in focusing for any kind of pictures.



Small Range Finder That Is Aid to Amateur Photographers in Correctly Focusing Objects

RAY TO OVERCOME GRAVITY IS SOUGHT IN SECRET

Hidden away in laboratories in the heart of Russia, German scientists are engaged in a secret search for a new ray to overcome the law of gravity, according to recent reports. Air experts are quoted as saying that they would not be surprised if this quest has resulted in discoveries which may revolutionize aviation. With abundant money and years of practical experience, the searchers are well equipped to carry on their work.

HOUSES BUILT OF PLATE GLASS AS STRONG AS CONCRETE

Glass houses are declared to have been made possible as the result of the recent discovery of certain chemical processes, together with a glass-making machine.

Model House Built of Glass with the Exception of Window and Door Casings

As strong and sturdy as the present residences of stone, concrete, or wood, it is said that homes of opaque glass will be much cheaper and yet will be warm in winter and cool in summer. Plastering, painting, and papering will be made unnecessary by artistic colorings added to the glass during its manufacture. The upkeep expense will be small, for there is no danger of decay from the effects of the weather. Plans call for the erection of five and six-room cottages, which, with the exception of the frame, will be built entirely of glass, in both plate and block form.

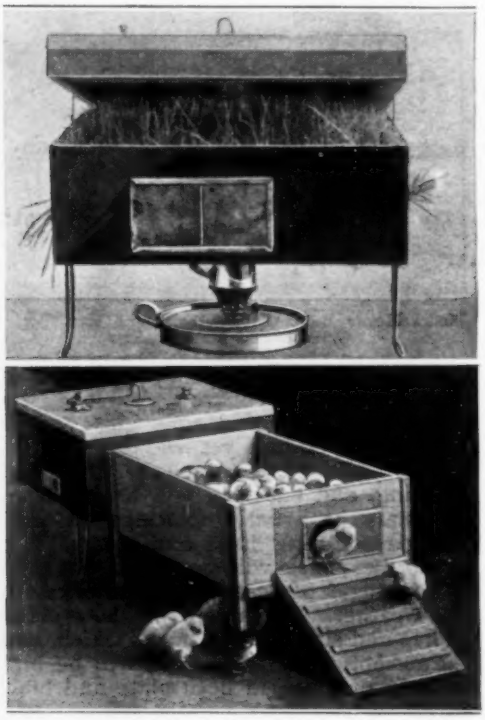
GAS-TANK COVER FOR AUTO CANNOT BE LOST

To prevent its loss, an automobile gas-tank cap is being made that is permanently fixed to the car. Once attached, there is no need for removing it, as a spring cover, lined with cork, lifts up to permit filling. A quarter turn of its bar handles fastens or unlocks the lid, which also may be used for radiators.

¶ In an attempt to rid Russia of rats that are threatening the nation's health, the government recently sent a commission to Poland to buy 10,000 cats.

HATCHER FOR CHICKS SPROUTS OATS FOR THEIR FEED

By adding a runway made of a dry-goods box, a chicken hatcher that weighs 14 pounds, can be easily converted into



Incubator that Serves as Brooder for Newly Hatched Chicks; Above, Crop of Oats Growing in Hatcher

a brooder. The incubator, which has a capacity of sixty eggs, may also be used for sprouting oats for feed, requiring three days in winter and two during summer, to start growth of the grain.

RIVER REVERSES ITS FLOW WHEN SWELLED BY RAIN

So heavy was the rainfall during a recent storm over Chicago, that the Chicago River, normally draining from Lake Michigan through a canal, and thence to the Mississippi River, was reported to have changed its course, and flowed into the lake for nearly an hour. The deluge raised the water level at the locks, almost 40 miles away, until the height there was greater than that at the source. The stream emptied into the lake until 23 years ago, when it was reversed by engineers, so that it would carry away the city's sewage.

INSECT PARASITES TO BATTLE PRICKLY-PEAR PEST

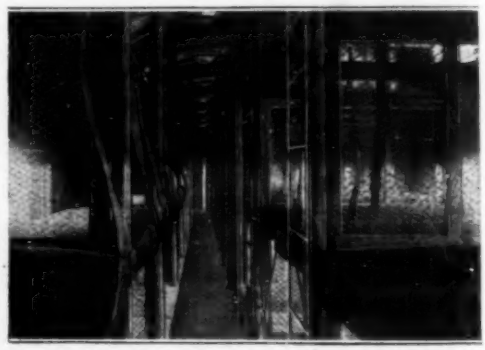
With approximately 40,000,000 acres in Queensland and about 6,000,000 in New South Wales invaded by the prickly-pear pest, cochineal insects have been imported from Ceylon and northern India to check the plague. Various methods have been adopted to control the plant's spread, including its use for cattle fodder and as material for paper-pulp making and alcohol production. For many years bonuses of $20 an acre have been offered by the government to assist in clearing the land.

IRON CHAIR ON WHEELS USED TO PUNISH TRAMPS

Used 25 years ago as punishment for tramps, a queer-looking cage, shaped like a chair and set on wheels, was found recently on a scrap pile in the East. Made of iron straps, it completely inclosed a prisoner, giving him no opportunity to move. A shelf on the front served as a table. Regarded as torture, the practice was stopped.

BERTH FOR POOREST TRAVELER PROVIDED IN JAPAN

Sleeping cars for third-class passengers, said to be the first of their kind in the world, are operated by a railroad in Japan. Overnight travelers, heretofore unable to provide themselves with sleeping quarters at higher rates, are quick to take advantage of the accommodations that offer a clean, comfortable berth to the poorest patron at low cost. Like the



Interior of Third-Class Sleeping Car on Japanese Railroad: Note Bamboo and Wire Construction

ordinary railroad sleeper, the beds are built to fold up into seats for use of daylight riders.

CAMERA CATCHES TARPON IN BATTLE FOR LIFE

After two months of constant effort, a remarkable photograph of a giant tarpon, the silver king of the deep, valiantly fighting for his life, was obtained. Maddened by fear and pain, the huge fish broke water on a taut line, and, enveloped in spray, hurled itself with terrific force high into the air, trying to cast the cruel barb from its mouth. Even to the end, the gasping monster battled vainly to regain its freedom. The picture is regarded as among the most unusual ever taken of a leaping fish. While the tarpon is prized as food, it is more sought after because of the sport it affords the fisherman. Having seized the baited hook, a struggle begins that taxes skill and tackle to the utmost. The fish, the moment it feels the point of the hook, jumps from the water again and again, and, with gills distended, shakes itself violently. Then is displayed the marvelous strength which this giant of the herring family puts forth in its daily search for the smaller fishes upon which it feeds. Its scales, of beautiful silver tint, as large or larger than a dollar, are often used in making ornaments by residents along the southeastern coast.

In Last Game Fight for Life, This Giant Tarpon Hurled Itself High above Water to Throw Barb from Mouth

SAFETY EGG-HOLDER SAVES FINGER BURNS

As an addition to kitchen equipment, a lifter has been marketed that safely picks eggs from boiling water without cracking the shells or scalding the cook's fingers. It is also useful in handling vegetables while cooking, holding them firmly when taking them from steaming pans, and is of especial service in lifting corn-on-the-cob from containers in which it is boiled.

ANCIENT BIBLE IS DUG UP FROM EGYPTIAN TOMB

Excavating in an early Egyptian cemetery, explorers recently discovered what is regarded to be the earliest Egyptian version of the Gospel of St. John, believed to have been written about 400 A. D. Seventy-five papyrus leaves, three-fourths of the complete work, wrapped in a rag, were taken from a pot unearthed in one of the cliff tombs. When translated, the find is expected to shed light on the accepted idea of the Greek text in ancient Egypt. One of the oldest previous records of the gospel dates back to A. D. 200.

¶ What is believed to be one of the first pleasure power cruisers built with fish "wells" was launched recently. Underway, water flows through the tanks.

ELECTRIC RAILWAY SOLVES SPACE PROBLEM

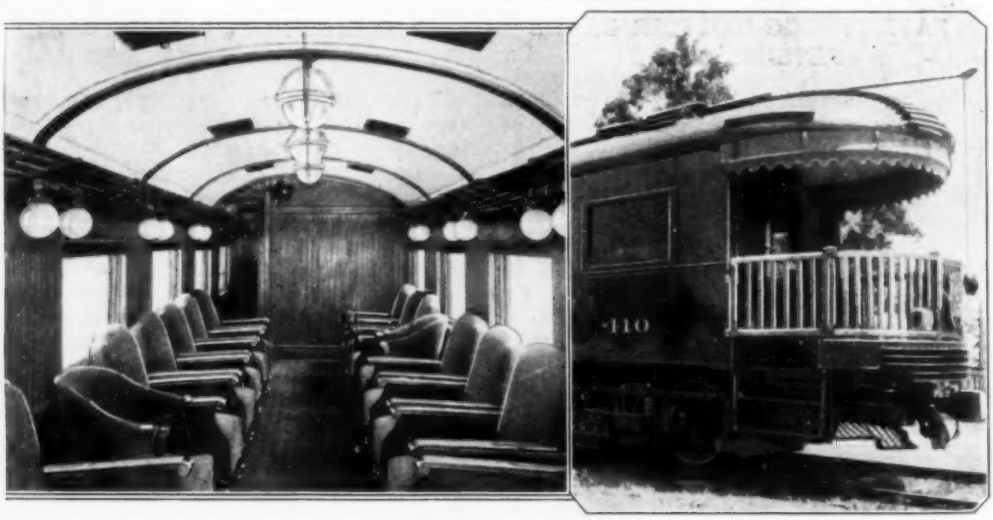
ENGINEERING problems of no little difficulty have been solved by an electric interurban railroad running between Chicago and Milwaukee in putting into service a new chair car and diner on one of its special express trains. The problem confronting the company was to create cars having all the necessary safety features and comfort of a steam railroad's service, yet so compactly built as to be practicable on its line.

Special framework construction was worked out, after several months' study, which assured safety, for the train travels often at a speed of 75 miles an hour.

In This Tiny but Remarkably Complete Kitchen All Necessities Have a Place

The diner represents unusually efficient building. In the tiny kitchen no space, however small, has been neglected or remained unused. With a working space only 2½ feet wide and 9 feet long, stoves, utensils, tableware, refrigeration, worktables, sinks, coffee urns, a steam table, clothes lockers, and many other storage spaces have been provided. The little room has been thought out scientifically to permit the cook to have every convenience "right under his hand" when needed. Odd-shaped spaces have been given doors so that they may be used. Notches had to be cut here and there to allow doors to open or slide back and forth. By clever arrangement, water, both hot and cold, has been piped from place to place—the tanks being on the roof of the car.

Many details have been worked out cleverly. For instance, it has been found most practical to make the coffee in the urn with water boiled elsewhere in the kitchen and then kept hot with a patented heating appliance burning alcohol.



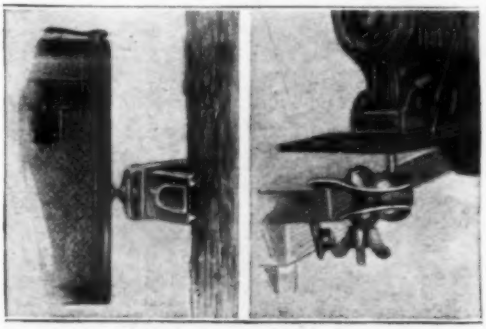
Chair Car and Observation Platform Offering Added Passenger Comforts on Intercity Electric Line

FINGER MOISTENER IN PALM OF HAND SPEEDS UP WORK

For convenience and speed in handling papers in such tasks as bookkeeping, machine posting, and feeding printing presses, a finger moistener that fits in the palm of the hand is being marketed. It eliminates reaching to a pad. The fingers are kept damp by touching them against a piece of felt, mounted on a small metal water reservoir, without hampering freedom of movement. As there is little wear on any of the parts, the device will last for a considerable time.

CLAMPS SERVE AS TRIPOD FOR HOLDING CAMERA

To serve the purpose of a tripod, small clamps that attach a camera with a firm grip to a tree trunk, fence, post, table top, or almost any other solid object, are being made in two types. One has felt pads to prevent marring the surface to which it fastens; the other has sharp sawlike edges pressed together by a strong spring. The clamps fit the ordinary tripod hole, and can be carried in the vest pocket.



Small Clamps That Act as Tripods by Clamping to Trees or Other Solid Objects

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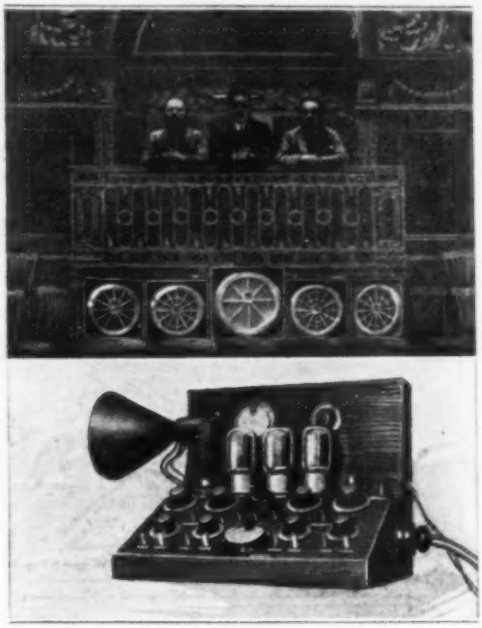
Graphite, from which lead pencils are made, was first discovered in Siberia in 1842.

"TALKING" LIBRARY OF VOICES TO PRESERVE LANGUAGES

To keep the words of all languages alive, a "talking" library has been established in Germany. Efforts are being made to collect the actual sounds of all languages and dialects of the earth, and to record and reproduce them with the aid of a special type of phonograph. At present, specimens of the languages of 217 nationalities have been recorded for study.



Radio Device Used for Carrying Voices in Germany in Long-Distance Concerts

SCARCITY OF WILD ANIMALS SENDS THEIR PRICE UP

Prices paid for wild animals are going up. Post-war conditions have so interfered with the industry of providing wild beasts for circuses and zoos, that few can be bought in the world market, the center of which is Hamburg, Germany. A giraffe brings $5,000; a hippopotamus, $2,500 to $5,000; and good lions are sold at $1,250. To replenish depleted stocks in captivity, hunters are planning a trip to a province in India, where, in previous years, many tigers were obtained. That territory now abounds with lions. Eight shipped there several years ago, have so increased as to become the terror of the country.

Merry-Go-Round and Water Golf Game Devised to Lend Variety to Beach Sports

Both Exercise and Amusement are Provided for Bathers by Great "Medicine" Balls, Tossed About in the Water

PHOTOS COPYRIGHTED, UNDERWOOD & UNDERWOOD

Life-Giving Rays of Summer Sun Are Found to Be a Cure for Many Ills

Science Reveals Why People Instinctively Seek the Sunlight; Beams, Invisible to the Eye, Are Stored in Coats of Tan for Making of Red Blood; Solar Energy Contains Power to Operate Devices of Man

WHY do human beings instinctively seek the sunlight?

Because of an instinct as old as mankind, science answers, and turns to the laboratory to study the effect of the sun's rays on the body.

In a long series of tests made recently in the East, it was found that these beams, many of them invisible to the naked eye, stimulate the production of red blood corpuscles. Two litters of rats were fed upon a diet that was weak in vital elements, one set being kept in a dark place and the other in the sunlight. While the latter thrived, despite the lack in their food, the former contracted diseases, and died.

In the experiments, some of the rats were kept under glass, and much the same thing happened to them as to the ones that had been placed in the dark, which was taken as proof that the direct rays of the sun, in some mysterious way, made up for the deficiency in diet.

Attention was then given to the study of sunburn, to find out its place in the general health of the body. It was found that this layer of bronze not only acts as a protection to the skin, but also absorbs and stores up for future use the life-giving rays in proportion to the lightness or the heaviness of the coat of tan. As a result, it was found by actual count that the red blood corpuscles increased, while the muscles were stimulated and deeper breathing was set up.

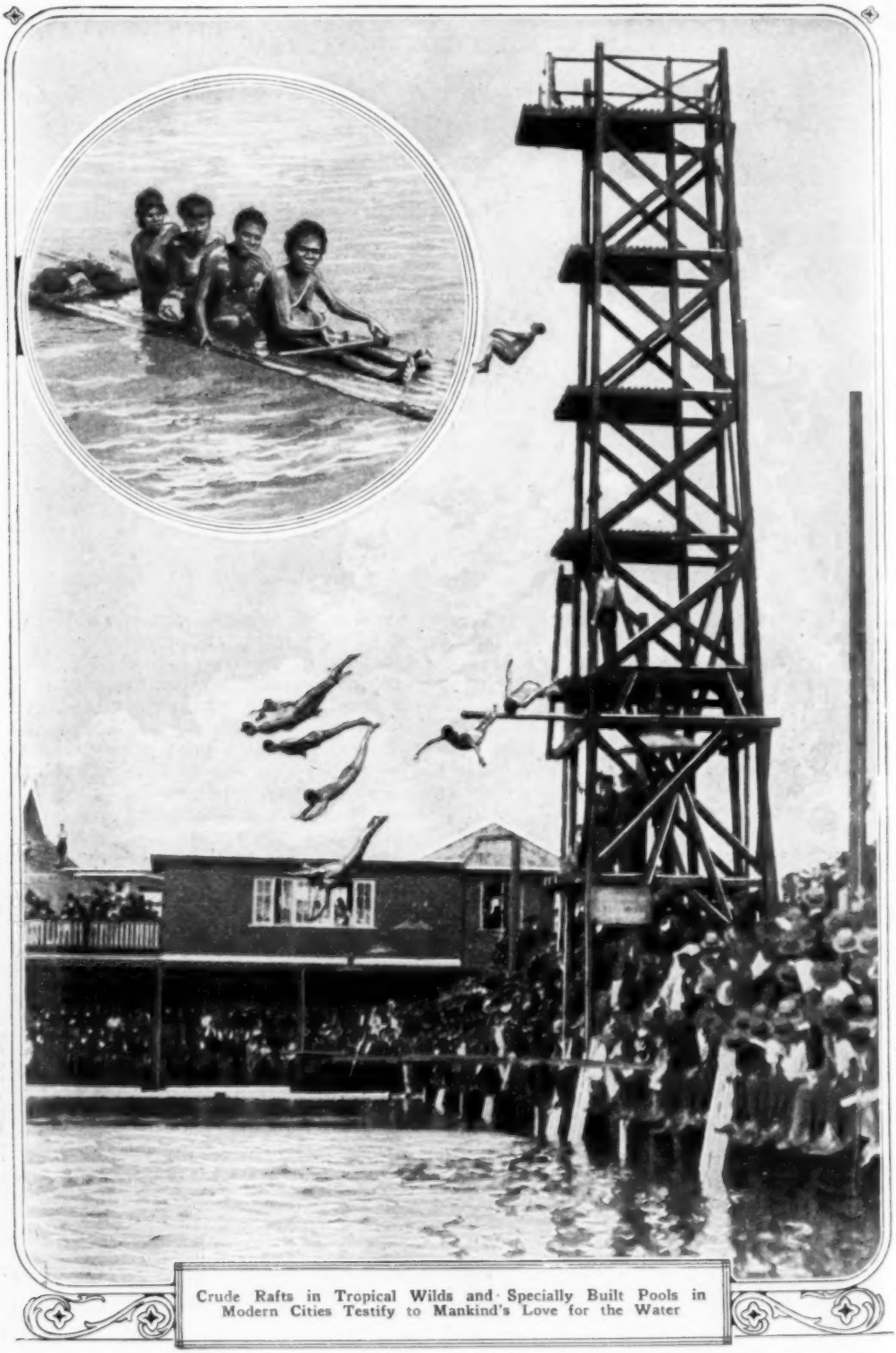
Like all other human organs, the sense of sight is limited, the experimenters explained. It is sensitive to only a certain range of light waves in its reactions, waves of greater or shorter length being invisible but producing dull pains in the eyes.

Artificial light is declared to contain a greater amount of these invisible rays than does natural light. As a result, the eye tires more quickly under artificial glares.

And so, in fleeing from crowded tenements, hot offices, and secluded homes, to lakes, fields, and streams each summer, mankind is only obeying an instinct as old as the race, the demand of tired bodies for something essential to their welfare. This also is shown by the experience of a sun school in Switzerland.

Built high up on the Alps, it was first thought that the wonderful results ob-

Summer Skies and Blue Waves Prove an Irresistible Magnet in Pulling Toilers from Work Benches and Desks in All Parts of the Country to the Cool Bathing Beaches



Crude Rafts in Tropical Wilds and Specially Built Pools in Modern Cities Testify to Mankind's Love for the Water

PHOTOS COPYRIGHTED, UNDERWOOD & UNDERWOOD

tained in treating ailing children were due entirely to the effects of the sunlight on germs. But it has also been proved that germs can be killed, or at least rendered inactive, in very cold climates, without helping the patient as much as the sunlight does. The new discoveries are said to show that even more than the germ-killing qualities of the sunlight, is the creation of new vital red blood, which is itself one of the most potent destroyers of germs, and the restoring of chemical balance, without which no body can work properly.

Swiss Sun School in Alps Where Ailing Children Are Exposed to Life-Giving Rays

Since earliest days, the sun has been regarded with awe by mankind. Traces of sun worship appear in the oldest records of the human race. They are present in the old theology of Egypt where it was believed that "Ra," who traveled the upper and lower regions of the universe in his boat, was the sun himself.

Modern Hinduism is full of sun worship and it exists among the Kol tribes, the Khonds, and the Tartars, and is still found among the native races of Central America.

Now scientists are looking to the sun to provide a practically limitless amount of power. Harnessing solar energy, it is pointed out, offers a great field for inventors.

ICE HAULS NATURE'S FREIGHT WITH WIND AS LOCOMOTIVE

Although man has covered the world with railroad systems and steamship lines, Mother Nature is the pioneer in transportation service. For ages she has been moving her own products from point to point by many different methods. One of the most unusual of these transfers occurs in the formation of bottom ice which freezes at the bottom of fresh and salt-water bodies. Stones, rocks, and other débris become imbedded in these cakes, which, after a time, move upward toward the surface, often with sufficient force to shoot high into the air.

Then these pieces of ice, sometimes as large as a house, become huge "freighters," traveling considerable distances with the winds and current. As they melt, the stones and other fragments sink to the bottom again. That parts of sunken ships have been carried many miles in this manner has been proved by deep-sea divers, who have found them literally covered with stones that came from other localities. Near Copenhagen, a block of granite weighing more than 400 tons was lifted from the ocean bed and moved to a place miles distant. In the same neighborhood hurricanes drove far up on the shore sheets of ice that, when melted, left piles of ocean-bed rocks, chains, and parts of sunken vessels.

SAFETY BATH TUB FOR BABY HAS DRESSING-TABLE TOP

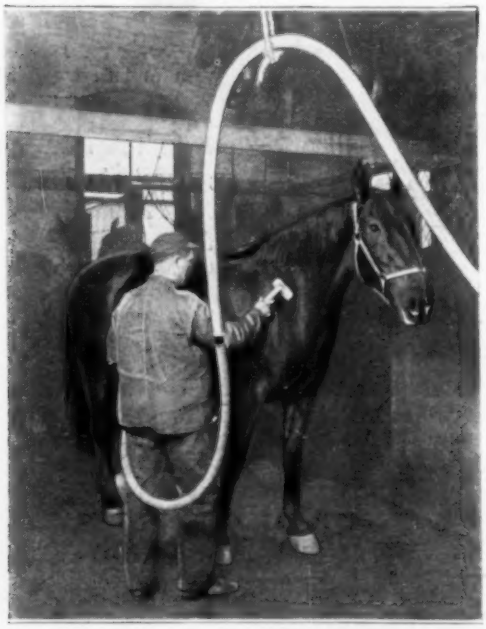
With a movable cover that acts as a dressing table, a safety bath tub for babies has been invented by a western man. Made of canvas, and hung from a wooden frame, it fits across the ordinary bath tub, so that the child is almost

Baby's Bath Tub with Cover Down, Serving as Dressing Table; Below, Infant Safely Held in Water

on a level with the top. When the bath is completed, the cover can be used as a table, providing space for clothes and toilet articles. Thus the person bathing the child need not bend over the tub.

VACUUM CLEANER FOR HORSE REPLACES HAND COMB

With a currycomb attached to a vacuum cleaner, members of the fire department of a Middle Western city clean and dress



Cleaning and Dressing the Hair of a Horse With Currycomb Attached to Vacuum Cleaner

the hair of several horses in the same time as required by hand for one animal. The scrubbing is more thorough, too, it has been found, and requires much less physical effort. The comb can be applied to stationary types of suction cleaners by using a hose long enough to enable the operator to pass around the animal.

EYE SHADES SNAP ON GLASSES TO MELLOW LIGHT GLARE

For workers who perform their tasks under strong lights, eye shades have been devised that snap to the frames of spectacles of any size or style. Attached or detached in an instant, the shades, made of colored transparent material, soften the rays from overhead lighting fixtures, thus lessening the probability of strain, fatigue, or headaches resulting from glares.

FIFTEEN YEARS ADDED TO SPAN OF LIFE IN PAST FIFTY

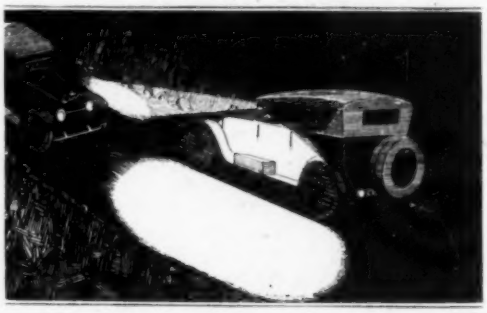
Figures have been compiled showing that the average length of life for inhabitants of the United States has increased almost 15 years in the past 53. In 1870, the average was 41 years, while now it is almost 56. By 1950, the span will have reached the biblical threescore and ten, provided the present high standards of civilization and correct living are maintained, a scientist has predicted. In the 16th century the ordinary term of life was between 18 and 20 years, and about 1800, it was still less than 25 years. At the end of the 19th century, it ranged between 45 and 48 years.

TRENCH HELMETS IN MINES PROTECT WORKERS' HEADS

Heavy trench shoes and tin hats, that served to stop shrapnel on war-swept fields of France, are being used by many miners in the West as protection against falling ore and rock. Recently a large company was so impressed with the value of these war implements that its officers provided all their miners with them. The safety idea spread. Men who left the mines for war and were there convinced of the worth of the helmets, have induced others to use them.

SPOTLIGHT WITH SIDE RAY FOR NIGHT DRIVING

Not only is the dark road ahead illuminated, but also that at the side of the car, by an automobile spotlight patented recently, having two lights within one shell.



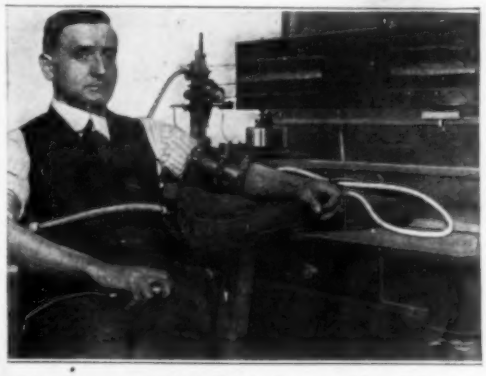
Front and Side of Road Illuminated by Spotlight to Lessen Danger of Accident

Thus, the danger of collision or running off narrow highways at night is avoided. By moving the bracket, the side light can be made to throw its rays rearward.

TRUTH IS SOUGHT BY DRUG IN "TWILIGHT SLEEP"

EVER since the time of Diogenes, philosopher of ancient Greece, who is said to have carried a lighted lantern with him night and day in a quest for truth, men have been seeking a means to accurately distinguish between the false and the true, a method that would unerringly judge a person's honesty. Within recent years, science has brought forward inventions to aid in that century-old search. One of the latest that has been called to assist criminologists is scopolamin, a drug that produces what is termed "twilight sleep."

For years it was used in a western penal institution as a treatment for drug addicts. The first announcement of its power as a producer of truth from those even unwilling to give exact information came recently, after more than 500 tests are said to have shown its worth. Since then it has been tested publicly on men convicted of crime and serving prison sentences.



"Lie Detector" being Tried Out on Man Who was Freed of Murder Charge

As a result of the tests conducted in the prison, it is reported that a convict suffering from loss of memory revealed his correct identity, and another inmate cleared up seven robberies that had puzzled the police. The police department of one western coast city already has adopted the scopolamin test as part of its regular method in examining persons suspected of crimes.

One of the men given the twilight-sleep treatment was under indeterminate sentence of ten years to life on conviction of the murder of a Chinese at Sacramento. He was anxious to undergo the test, and, placed in the semiconscious condition, he was asked:

"Did you ever kill a Chinese?"

His reply came immediately, "I did not."

"Who killed the Chinese?"

"My partner, ——— ———, shot him."

"What did you do?"

"I robbed him and put the money in my overcoat pocket."

"What kind of money?"

"Coin."

It is said that the drug deadens a man's reasoning powers, and his control over the "dress" of words with which he clothes his statements. The subject rationally replies to questioning, but since the conscious mind is under the curb of the administered drug, the imagination is dormant and the replies are statements of fact coming from the subconscious mind, unaltered in the telling by the desire of the speaker.

It is claimed that it is impossible for a person who has been given this twilight sleep in the proper quantity to tell an untruth, to exaggerate the truth, or to evade the truth in any way.

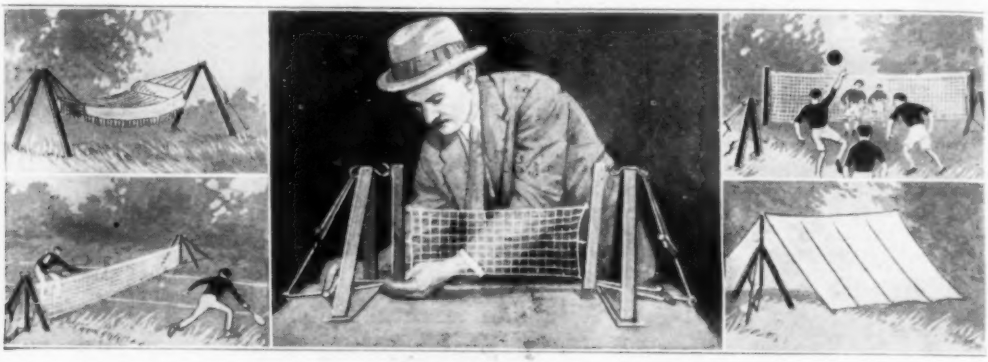
The "lie detector" is another device being used by investigators to aid them in the solution of crimes.

FREAKS OF CLIMATE SHOWN IN WATER-BOTTLE TEST

Through underground observation stations, scientists have recently completed a series of experiments that indicate Mt. Desert Island, a few miles off the coast of Maine, has a higher average temperature and greater evaporation than Long Island, more than 200 miles to the south. The recording instruments consist of thermometers that register maximum and minimum temperatures and specially designed bottles, filled with distilled water and fitted with porous stoppers that protrude above the ground. When the sun strikes them, the liquid is drawn from the glass containers in the same manner that moisture is extracted from the earth. Measurements of the water are taken at intervals and the differences noted give the amount of evaporation. On this island, trees, flowers, and plants that are characteristic of the lands of ice and the more southern climes thrive, while birds of the arctic and the southland make it their common home during the spring and summer months.

TENNIS-NET HOLDER SERVES FOR MANY PURPOSES

Camp and playground are both provided for by a convertible apparatus that may be changed in a few minutes from a support for volley-ball or tennis nets, to a swing for hammocks, or a tent frame. It may also be changed to a turning pole for gymnasium work, or used as a sunshade. For parks and large playgrounds, any number may be set up to meet the demand for various games.



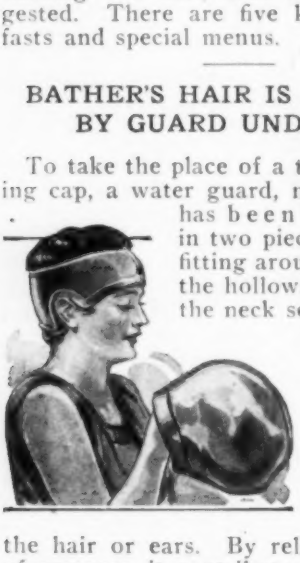
Convertible Apparatus That can be Easily Changed for Camp Comfort or Playground Pastime

VARIETY IN MENUS GIVEN BY TURN OF A DIAL

Variety in meals is suggested by a turn of the dial on a card recently made to hang in the kitchen. It is designed to relieve cooks of the task of planning well-balanced menus that differ from day to day. Twenty-four kinds of breakfasts, luncheons, and dinners are given a number. A meat is selected and, by turning the dial, side dishes are suggested. There are five kinds of breakfasts and special menus.

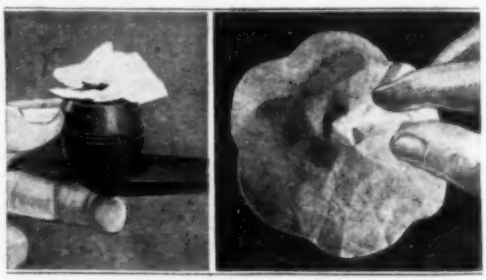
BATHER'S HAIR IS KEPT DRY BY GUARD UNDER CAP

To take the place of a tight-fitting diving cap, a water guard, made of rubber, has been patented. It is in two pieces, a heavy rim fitting around the ears and the hollows at the back of the neck so that when the cap, just tight enough to press against the rim, is worn over it, there is no possibility of getting water into the hair or ears. By relieving the head of pressure, it contributes to the comfort of swimmers and bathers.



PAPERS FOR PIPE TOBACCO KEEP THE BOWL CLEAN

To save cleaning a pipe, smokers in Europe wrap tobacco in small pieces of tissue paper. This makes a pellet shaped like a torpedo. After tearing a hole in the base, so smoke will draw through the stem, the tobacco is placed in the pipe bowl and a light applied to the tissue at the top. Packages of circular pieces of tissue were recently placed on the tobacco market in the United States for this purpose.



Tobacco Wrapped in Tissue-Paper Pellets, Shaped Like Torpedoes, to Save Cleaning Bowl

¶ Through an agreement of airplane companies with continental railways, it is now possible to travel from London across Europe to Constantinople in less than 30 hours. Passengers, leaving London in the late afternoon, arrive in Constantinople the following night, part of the trip being made by rail and part by the air route.

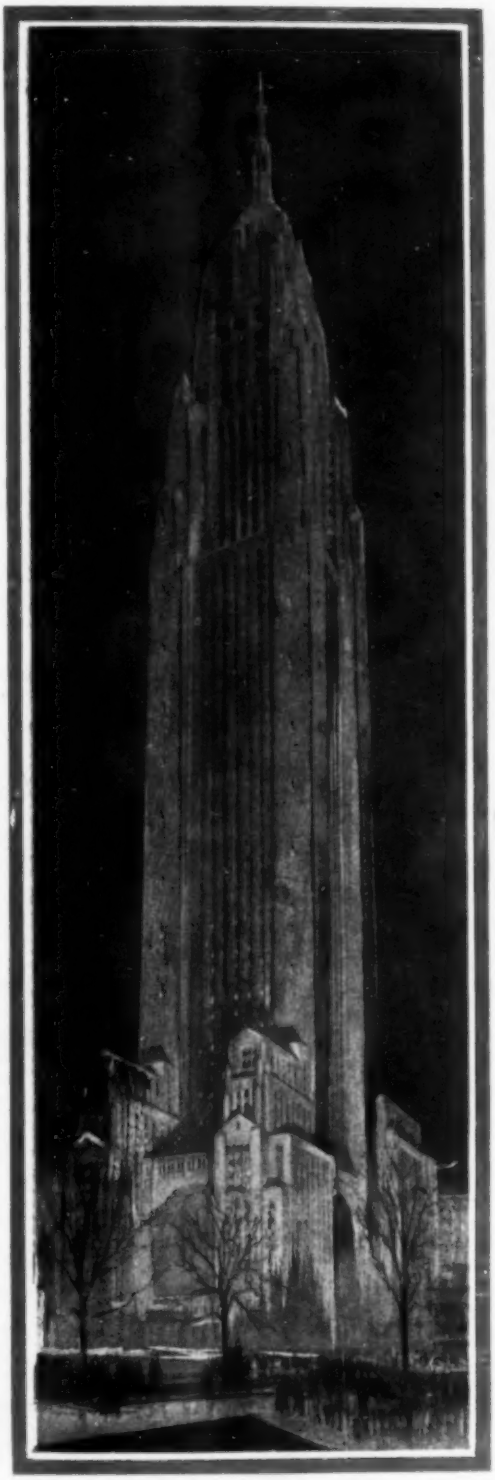
NO LIMIT NOW IN SIGHT FOR SKYSCRAPERS

HOW tall and how large can a building be? Just recently an eastern architect conceived a structure 80 stories high. The Woolworth building, known as the highest commercial structure now, is 58 stories. As to size, the answer seems to be, "As large as practical."

Although fire hazards and other considerations have resulted in limiting the heights of buildings in many cities, architects declare that the general tendency is continually upward.

With 1,237,000 square feet of floor area, the Equitable building in New York is still the largest office building in the United States. The Union Trust company building in Cleveland is second with 1,173,000, and the General Motors building in Detroit, third, with 1,054,685. The Woolworth has 550,000 square feet.

It is a curious fact that the Woolworth building, although not the largest, has the most tenants—almost 14,000. The Equitable has 12,000, the General Motors about 6,000 and the Union Trust will have about the same number. The Equitable building is equipped with 63 elevators, the Woolworth building has 29, and the General Motors, 27.



Proposed Eighty-Story Skyscraper to House Church Activities in New York City

Washing the windows of great skyscrapers is a considerable task. The Equitable, for example, has 11,000 panes of glass and but ten men wash them. In the same structure, 90,000 persons use the elevators, 43,000 pieces of mail are received, and 88,000 sent out every day.

In general, the trend in large buildings is toward something restful to the eye as well as strictly utilitarian. An example of this is to be noted in the Chicago Temple building, declared to be one of the most beautiful in the world. Twenty-one stories high, it was constructed by the Chicago Methodist Episcopal Church and Society, and although a downtown office building, houses one of the finest churches in the city.

In the Wrigley building, Chicago has another imposing structure, to which will be added a third when the new building of the Chicago Tribune is completed, the design for which was selected at the conclusion of a $100,000 prize contest among architects.

In New York, an 80-story building has been designed by Bertram Grosvenor Goodhue to house the religious activities of the Protestant denominations.

ROSES ARE MADE FROM GOLD IN COLORS OF NATURE

Fashioned of jewels and beaten gold, a vase of roses in natural colors was recently made for the queen of Spain. To make the flowers and leaves the proper color, various shades of red, yellow, lemon, green, and white gold leaf were used. Working with a metal so malleable that more than 1,000 three-inch squares can be beaten from one ounce, an exact model of blossoming roses and buds on the stem was created. Leaves were given a greenish tint by use of gold leaf about the 150,000th part of an inch in thickness. Alloys of silver and copper were mixed with gold to produce the desired colors and then the metal was melted in a crucible. After this it was cast in an ingot, flattened into long, narrow strips, and beaten with a 17-pound hammer for 20 minutes. Then it was cut into sections and put between ox skins of a "shoder," where it was pounded again. Artists of a family that for generations has been skilled in this ancient craft spent months in perfecting the queen's gift.

Golden Roses Made for a Queen in Europe That Show Skill of Artists in the Craft

BATTLE SEA IN OPEN BOATS ADRIFT THREE WEEKS

For more than three weeks members of the crew of the Australian ship "Trevessa," shipwrecked recently in the Indian Ocean, rivaled tales of fiction when they battled against death in tiny, open boats as they steered their way by sun and stars to safe island harbors. One boat traveled 1,740 miles in 25 days. Death claimed nine sailors. The other boat reached safety in 22 days, after experiencing high seas and very heavy weather most of the 1,450-mile journey. Two firemen died from exposure on the 10th day. When 1,800 miles off the mainland, a heavy storm had come up and the ship's captain ordered lifeboats launched. For five days the captain and the chief officer kept their boats together in a vain hope that they would be rescued, but they were separated by storm. Though frequently blown off their courses, the men kept up courage in the face of what seemed almost certain death, and finally came the triumph of the brave when they landed on the island of Rodriguez.

BUG IS SOUGHT IN THE ORIENT TO KILL PLANT BEETLE

In an attempt to stamp out the Japanese beetle, a beautiful copper-colored insect that has infected plant life over an area of almost 1,000 square miles in two eastern states since 1916, when it was accidentally introduced into this country, scientists have been sent to China, Japan, Korea, and Hawaii to find a bug that may prey upon it and eventually wipe it out. Unrestrained by attacks of parasites that feed upon it in its native home, where it is called the bean beetle, the insect has multiplied rapidly despite strenuous efforts to exterminate it. Its ravages have become so destructive that the federal government and the states of New Jersey and Pennsylvania have been forced to quarantine a number of farms in an endeavor to check it. Despite the invention of death-dealing sprays, the march of the pest every year increases about five square miles on each side. The first specimen migrated to the United States on the roots of azaleas imported from Japan.

SERUM HAILED AS ABSOLUTE PREVENTIVE OF MEASLES

After years of search, a preventive of measles is said to have been found recently by French scientists. Although experimental work still continues, it is said that the results already obtained will

be of great value in stamping out epidemics. In tests at the Pasteur Institute in Paris, France, in 1911, a small amount of serum was taken from a person afflicted with the illness and injected into a healthy individual to produce immunity. Subsequent trials are declared to have brought out the fact that by following the initial vaccination with a secondary one, consisting of a small quantity of blood from a person suffering from the contagion, and repeated several times at intervals of a month, complete immunization would occur.

RED MIRROR ON AUTO SERVES AS WARNING TAIL LIGHT

With a lens and a conical-shaped reflector of spun glass placed on the rear license plate of an auto, rays of the headlight of a car at the rear are picked up and cast back in a red glow. There are no wires, battery, globes, or oil lamps that might fail. With a metal nameplate around the lens, some types are being made to carry an advertising message. The principle is the same as that of some

Signal That Picks Up Light from Autos at Rear and Sends Back a Red Glow

warning signals that are placed on dangerous curves to pick up lights from approaching autos.

¶ To aid the farmer with reports of market service, the government has recently completed a 7,000-mile leased-wire telegraphic circuit. It extends from Boston to San Francisco and connects the leading live-stock and market centers of the country.

OIL STOVE LIKE PHONOGRAPH BOTH HEATS AND COOKS

An oil stove that looks like a cabinet phonograph, with mahogany or oak fin-

Oil Stove for Heating and Cooking That Looks Like a Cabinet Phonograph and Takes No More Space

ish to the metal, is made for heating and cooking. Opening the top doors reveals not a sound box but the plate for boiling and frying. The heat that warms the room does the cooking. There is no costly motor, the flame being made on a small burner. Absence of coal dust, ashes, dirt, or bother about renewing fuel are features that are aimed to attract women users of the stove. One filling will last for several hours, it is said.

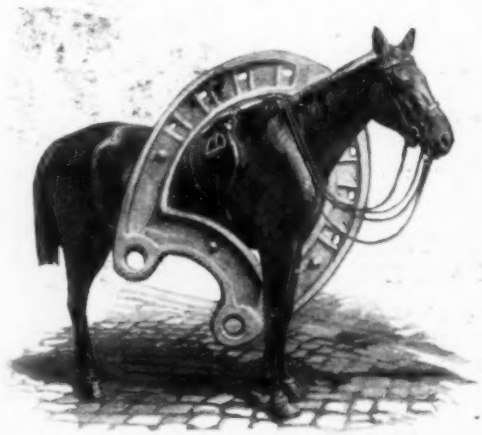
FIRE IN FORBIDDEN CITY RAZES SON OF HEAVEN'S PALACES

Mystery surrounds the fire that recently destroyed several of the beautiful and historic buildings of the Forbidden City at Peking, the "Holy of Holies" of the Celestial Empire and the proudest product of Chinese genius and culture. In its exquisite gardens, its delicate halls filled by the piety and industry of 300,000,000 subjects with the noblest art of a great civilization, lived the Son of Heaven, the emperor. The very names of the buildings he inhabited are poems. "Palace of Earthly Bliss," "Throne Room of Perfect Peace," "Palace of Cloudless Heaven"—such were the designations of the wonderful structures within its walls. While a disinherited Son of Heaven still lives in these fairylike surroundings, his power has vanished, apparently beyond recall.

Deluge of Paper Money Leaves Trail of Ruin, Famine and Death in Europe

Beggars Are Turned into Millionaires and Princes into Paupers in a Day, while Poor Lack Even the Necessities of Life

UNDERMINING the very foundations of once powerful nations, turning beggars into millionaires and princes into paupers while the children of the poor cry for the bare necessities of life, the flood of cheap paper money continues to rise in Europe.



Ten Years Ago This German Horse's Value Equaled that of One of Its Shoes at Present

Like a ghost city, with its population diminished and its glories departed, once merry Petrograd stands as a symbol of the tragedy that has engulfed so many former centers of civilization in the past few years. Even the main roadways, like the Nevsky Prospect, seem to be caving in.

Stranded vessels rot at their docks along the quays. Long thoroughfares present grim pictures of desolation such as can be furnished only by empty, fallen, and stripped houses. Among the tarnished splendors of the Winter Palace and the Tarskoye-Selo, sit bearded bolshevist officials.

In Moscow, now the seat of the government, there is more activity, but here, too, are found strange contrasts. Within the shadow of the walls of the Kremlin, a relative of the late czar is found driving a street car. Near by is a former general in the tattered remnants of a uniform, selling newspapers.

Along the Unter den Linden in Berlin, and the Ring Strasse in Vienna, similar incidents are to be observed as the poorly nourished inhabitants struggle to obtain the barest necessities of life. Small apricots sell at 60 cents each. At the dairy, a quart of milk commands a price that would have purchased three first-class cows before the war. Next door the baker smilingly asks as much for a loaf of bread as would have bought a richly furnished automobile in the old days. The bottle of beer, that the innkeeper places before the tourist, has the same value as a truckload of it a decade ago.

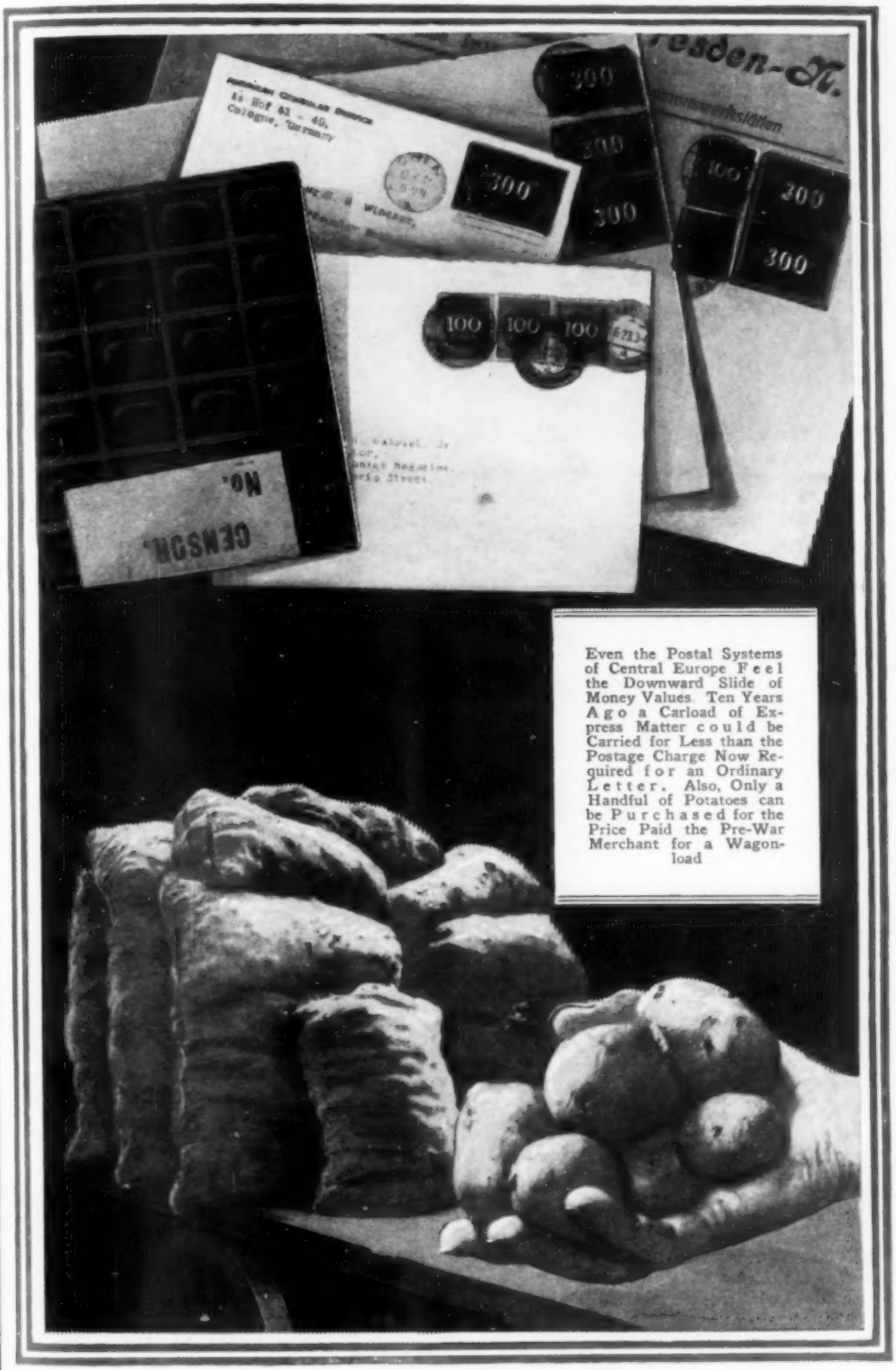
German post offices will not accept a piece of mail until at least 500 marks in stamps have been attached to it. Asking a genial stranger for a match is equivalent to seeking the gift of the hundredth part of a wagonload of cord wood, as the box of matches now costs as much as the wood would have brought in former times. Money is so plentiful and so easily produced that its value has almost vanished.

In the Balkan countries and farther east, similar conditions prevail. Almost all of Europe is overburdened with floods of paper currency. Germany alone has 41 plants working 24 hours a day and turning out 17,563,819,142 marks' worth of notes every hour.

During July the total paper currency circulating in that country was 20,241,782,966,000 marks. In addition there was 21,200,000,000 marks in aluminum coinage. At that time it was officially stated that no note under the face value of 1,000 marks will be printed in the future, as it costs more than the note itself actually is worth to print any of the smaller denominations.

One curio collector is said to be paying from five to ten times the face value of certain old 100-mark and 1,000-mark notes, declaring that those printed from copper plates are the only ones acceptable abroad, as the later ones, printed from type, are refused because they are too easily counterfeited. This is discredited in some quarters on the belief that the counterfeiters would lose money by producing false notes of such low denominations. In July for a single American dollar, the tourist received nearly 1,000,000 marks that formerly were worth more than 20 cents each.

In general, this flood of money has increased wages to amounts that would



Even the Postal Systems of Central Europe Feel the Downward Slide of Money Values. Ten Years Ago a Carload of Express Matter could be Carried for Less than the Postage Charge Now Required for an Ordinary Letter. Also, Only a Handful of Potatoes can be Purchased for the Price Paid the Pre-War Merchant for a Wagon-load

have represented comfortable fortunes a few years ago, but the burden has fallen heaviest on those dependent upon incomes from investments made before the value of the money reached the vanishing point.

Those who borrowed funds, in other days, now find it easy to pay their debts, but the creditors receive practically nothing. Less than a decade ago, the family or man with an income of 25,000 marks a year was considered wealthy. Today this sum would not buy a good meal.

In Russia the whir of the printing presses has almost ceased. Replacing the almost worthless paper rubles, there is a new gold-guaranteed currency. In July the new 10-ruble notes fetched more in both Russia and abroad than the English pound sterling. A 10-ruble gold note is worth just 825,000 paper rubles in Moscow, and the pound sterling is worth 815,000 paper rubles.

Austria has gone through a somewhat similar regeneration as the result of financial assistance given by other nations, but in some of the other countries little or no improvement has been shown.

German Banknote, with Concealed Vampire Face Biting the Bust's Throat, Visible When It is Turned Lengthwise

Meanwhile, it is estimated that approximately 2,000,000 members of the former Russian aristocracy have fled to foreign lands. Stripped of their possessions, they are to be found in scattered groups in Constantinople, Paris, London and New York.

One of the largest bodies of these exiles is said to have been aboard a strange squadron which the Russian Admiral Stark led into Manila harbor early this year. From there they journeyed westward in an effort to eke out a scanty livelihood.

In Paris lives the Grand Duke Dimitri, first cousin of the late czar and one of those accused of having slain the monk, Rasputin. In some circles he is recognized as the hope of Russian imperialism. After the collapse of the imperial army, he wandered about Europe for some time, finally arriving in France with less than 100 francs in his pocket.

With his brother-in-law, Prince Poutiatine, and the latter's wife, the Grand Duchess Marie Pavlovna, he started a little embroidery factory in a modest house in the section of Paris in which servants dwell. The princess, sixty-five years old, sad-eyed, tired and thin, acts as forewoman and saleswoman of the establishment.

Bent over a dozen embroidery machines, their eyes hardly ever leaving their work, may be seen a dozen members of the Russian nobility, glad to work for a wage of 2 francs an hour. Eight hours of this labor was worth about $1.50—just enough to keep the young woman in a widow's veil, the Countess Apracisine, from starvation.

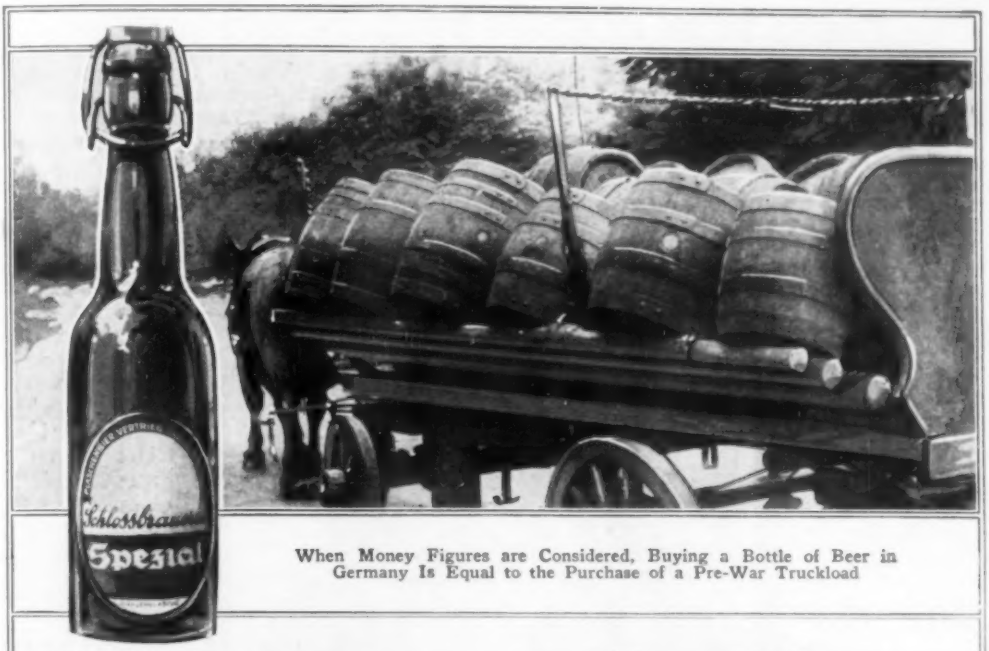
In a Paris dressmaking establishment over the door of which appears the single word, "Yteb," is the Baroness Wrangel, sister-in-law of the General Wrangel who failed in his campaign against the bolshevik army. In another is the Princess Kougoucheff who, through her courage and devotion, saved her mother, her old governess, and her two young children during the dark days of the revolution.

Brought up in luxury with no idea of ever working for a living, the lot of these refugees has been hard.

For the middle classes, physicians, lawyers, doctors, college professors and others living on fixed salaries and incomes, who were unable to flee from their countries, conditions have been almost equally trying, as the decrease in the purchasing power of their money often reduced them to a condition of actual want. Sometimes they entered the service of their governments without hope of pay.

On the other hand, the wages of skilled laborers generally have kept pace with the increasing cost of necessities and the farmers, except in times of famine, have been able to provide for their own wants.

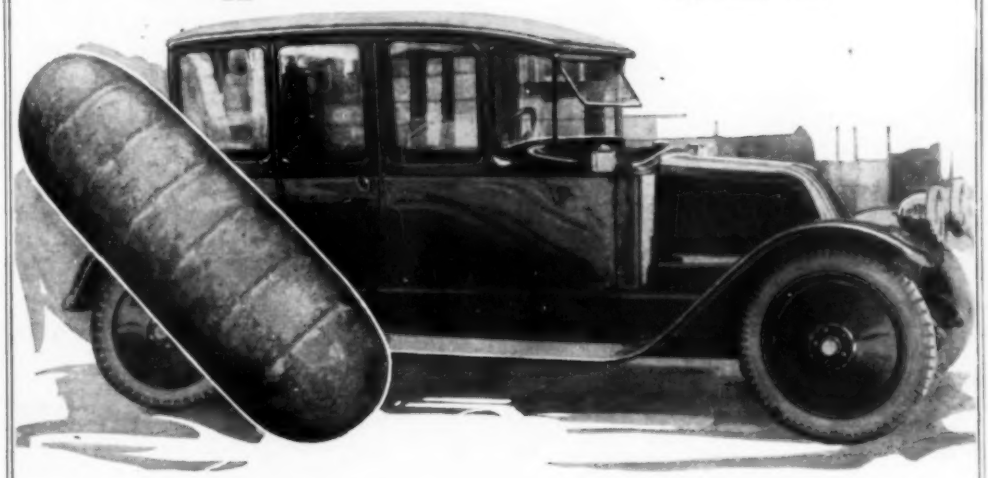
PAST AND PRESENT VALUES CONTRASTED IN EUROPE



When Money Figures are Considered, Buying a Bottle of Beer in Germany Is Equal to the Purchase of a Pre-War Truckload

Matches Cost More than a Load of Wood Did

Today's Pitcher of Milk Bought Three Head of Cattle Before Cheap Money Came



Prior to the Decline of Currency in Europe, the Cheap Rye Loaf Was Peasants' Fare. Its Present Price would have Bought an Automobile in Those Days

FISHES SWIM IN GLASS TUBE JOINING BOWLS

As a novelty in aquariums, a middle-western inventor has joined two fish bowls with a two-inch glass tube shaped like the letter "U." Fish swim from one jar to the other through this tube, which is filled with water before the bowls are connected. As many bowls as desired may be joined in this way. For his home the inventor has connected ten, making a unique display. Moss and other plants placed in the jars make the setting realistic. On the bottoms are models of turtles and frogs. Around these and up through the tubes the fish swim, their bright colors creating pleasing contrasts. A person's hand thrust into a bowl, forces the water to move through the tubes. Some of the goldfish have learned to remain motionless when this is done and seem to enjoy the ride as they are carried along in the current. Metal clamps resting on the jar tops, support the tubes. For refilling, a rubber cap is put on one end of the tube and water is poured into the other end. When full, both ends are closed, the tube is set in the bowls, and the caps taken off.

Bowls That are Connected by Glass Tube through Which Fish Swim High above Level of Water in Jars

JUNK HEAP FOR OLD "DOLPHIN" MAKER OF NAVAL HISTORY

Sold for junk, the historic "Dolphin," pioneer of the present United States Navy and once the first ship of the famed White Squadron, has passed into oblivion after a long and proud career under the Stars and Stripes. The launching of the "Dolphin," more than 30 years ago, marked the beginning of the growth of American sea power. Built as a "steam cruising vessel" and fitted with American armor plate instead of the European product that had been used exclusively prior to that time, the craft was greeted by a storm of ridicule that found an echo even in Europe. Rear Admiral Meade, then a commander, termed it "a marine crazy quilt, with not enough strength to attack an enemy, and not enough speed to run from one." The government at first rejected it, but later relented and consented to a trial trip. Commander Meade was ordered to try it. He headed into the "Atlantic Port of Storms" and waited for a hurricane. It came, and the old "Dolphin," although it rolled, tossed, and stood on its beam ends, came through with colors flying. At the outbreak of the Spanish-American War, it was ordered into active service, and throughout the hostilities performed blockade duty along the Cuban coast. When trouble with Mexico threatened in 1913, it was sent to Vera Cruz and then to Tampico, where it became a center of storm when a party of its sailors were arrested by Mexican authorities. Almost the oldest ship in the navy, the coming of the World War saw it again in active duty, overhauling and examining outward-bound and incoming steamers. In 1916, it performed its last conspicuous service, carrying Secretary of Navy Daniels and his party when they reviewed the Atlantic fleet. After 37 years of continuous service, the "Dolphin" was put out of commission in 1921, later it was sold, and now has been towed to its last harbor—the junk heap.

SIR WALTER RALEIGH'S FIRST PIPE SHOWN IN LONDON

Sir Walter Raleigh's first pipe with which he is believed to have introduced tobacco smoking in England, has recently

Sir Walter Raleigh's First Pipe, Now on Exhibition in a London Cigar Store

been found in London. Made by American Indians, and decorated with carved heads of people and animals, it is said that he smoked it on the eve of his execution. In the three centuries that have elapsed since, the spread of the habit has covered the civilized world. In the United States, a million and a half acres of land are given over yearly to cultivation of many varieties of the plant, producing a crop which occupies a leading place in the country's agricultural output. Government reports show the annual tobacco yield to be far above a billion pounds, with a value of over $250,000,000. While the industry gives employment to more than 158,000 people in this country, the manufacture of pipes and smokers' articles requires many thousands of workers to supply the demand for them that exists wherever tobacco is used.

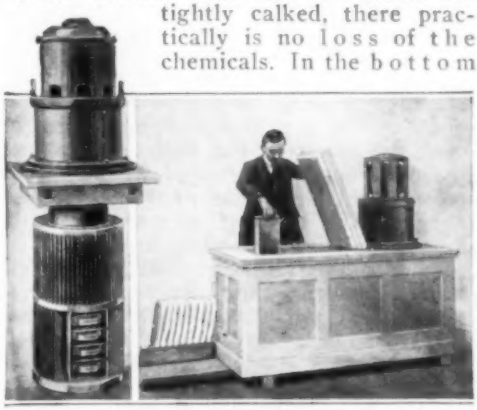
For the dog living in an apartment, costly baskets are being made in color designs to match the decorations. These sleeping cribs are furnished with mattresses and covers.

TRACE OF LOST RACE IS FOUND ON ISLANDS OF PACIFIC

What may be remnants of a civilization that existed 2,000 or more years ago have been found by explorers on the small islands of Necker and Nihoa, part of the Hawaiian group now set apart as a bird reservation. For centuries past, it is believed that those isolated spots have sheltered the secrets of once powerful colonies that may have flourished hundreds of years ago, prior to the Polynesian migration which resulted in the settlement of the Hawaiian chain. In the parts of temples, houses, and traces of system of agriculture, which have resisted the fury of the elements for an unknown period, the experts believe may be found the solution to the mystery surrounding the origin and travels of the ancient Polynesian tribes. The scientists brought back with them bowls hewed from solid rock, a headless idol, and other relics, and told of ruins they regard as evidence that the two islands were the homes of peoples skilled in navigation thousands of years ago.

ICE MACHINE SMALL ENOUGH TO CARRY IN HANDS

So small that it may be carried easily, an ice-making machine that is operated by an electric motor has been invented in Germany. Frigid air is produced by the alternate evaporation and condensation of a chemical contained in the upper part of the device. Since all the seams are tightly calked, there practically is no loss of the chemicals. In the bottom



Ice-Making Machine Easily Carried, That Makes Own Ice and Freezes Cream

are pans that may be filled with pure water or ice-cream mixtures. Within a short time the contents are turned into ice or ice cream.

CAKE IS MIXED BY MOTOR QUICKER THAN BY HAND

To make mixing a cake easy, an attachment has been invented to be run by a household electric motor, such as are

Attachment for Small Electric Motor That Replaces Hands in Mixing Cake Dough

used to operate sewing machines. The device stirs the dough just as thoroughly as if done by hand, and in a fraction of the time. Quickly adjusted, it may be set up on the bread board, kitchen table, or cabinet within any bowl deep enough to hold the ingredients.

ELECTRIC CELL RIVALS EYE'S SENSITIVENESS TO LIGHT

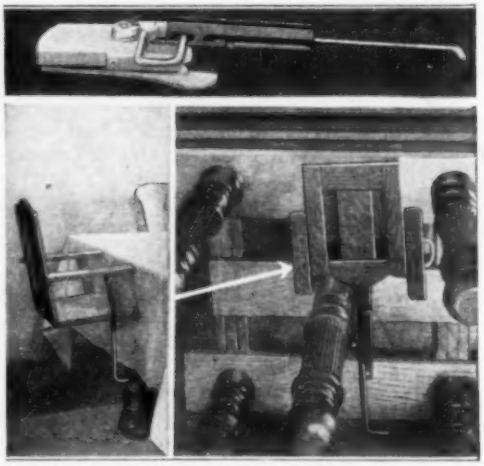
So sensitive that rays from the flame of a match held 4 feet away will affect it, an electric cell, undergoing a series of tests by eastern experts, can be operated by having beams of light thrown upon it. In appearance, it resembles an ordinary electric-light bulb, except that its inner surface is coated with a silver-colored chemical that offers less resistance to the flow of electricity as the amount of light showing upon it is increased. When light rays strike this delicate substance, they cause the cell to open an electric circuit that carries current to four large lamps. With the aid of this cell it is believed that daylight and darkness can be used to do the work of men in starting and stopping machinery, operating powerful beacon lights in lighthouses, and for setting off alarms. It could be made to turn street-lighting systems on and off, and control the flow of water in reservoirs. Weather experts would be helped in recording the number and length of sunny days, or cloudy periods for different places, while the cell could be made to show the presence of storm clouds in the skies between distant points for the purpose of timing their speeds of travel.

FORTY-MILE RIVER DAMMED TO PREVENT FLOODS

After seven years of building, a dam that stops a 40-mile river in South Africa was recently completed. A barrage type was chosen to prevent collecting of mud and earth in the reservoir and to avoid flooding of private property on the river banks. In the average year enough dirt is carried down this river to cover 720 acres a depth of 6 inches. Passing through tanks and filters and being treated with chemicals clears the water. Thirty-six sluice gates control the huge barrage, 1,400 feet long. When full, the depth of the water will be 25 feet. At the formal opening a British prince officiated.

VANISHING CHAIR FOR BABIES FOLDS UNDERNEATH TABLE

Folding up and sliding on a rod beneath the table top when not in use, a baby chair has been designed to meet the needs of small rooms and apartments. At mealtime it can be drawn out from its place and opened up for the occupant, making an extra chair unnecessary. It



Folding Chair for Small Children That Disappears beneath Table Top When Not Needed

can be attached to any dining table without taking up space usually occupied by larger persons on ordinary chairs.

MATCHES USED FOR MONEY WHERE COPPER IS RARE

Where copper coins are scarce in some parts of Manchuria, matches and postage stamps are used for small purchases. In one city, a bank has granted loans of $200 to $500 worth of coppers to each of 500 small shops. They are worth about 160 to the American dollar.

GRAFTING COTTON TO TREE MAKES CROPS RICHER

Grafting a single cotton plant to the root of a mulberry tree has produced 900 bolls, or pods, where formerly 40 was a good crop. The process, an invention of a southern plant breeder, is being widely watched because of the possibilities it offers in reducing the cost of cotton. Some of these grafted plants are nearly 8 feet tall and have well-developed fibers, called staples. The production

Inventor Examining Cotton Plant That was Grafted to Mulberry-Tree Root, Increasing Production

rate is greatly increased, three mother plants giving about 60 pounds of seed cotton, or four bales per acre.

FLAME THROWER TO FIGHT GRASSHOPPERS IN WEST

To combat plagues of grasshoppers, a flame thrower has been devised in the West. By means of an air compressor, gasoline and air are projected through a long rubber hose, lighted at the nozzle and the blaze sprayed over the ground, killing the grasshoppers instantly. The insects usually travel in ranks with a front from 100 yards to one quarter of a mile and with a depth of perhaps 50 to 100 feet. When bunched in that manner, the instrument has been found effective.

KITCHEN IS RUN FOR GERMS BY GOVERNMENT EXPERTS

In a kitchen where test tubes, flasks, funnels, and jars replace pots and pans, where stoves are single-flame gas burners,

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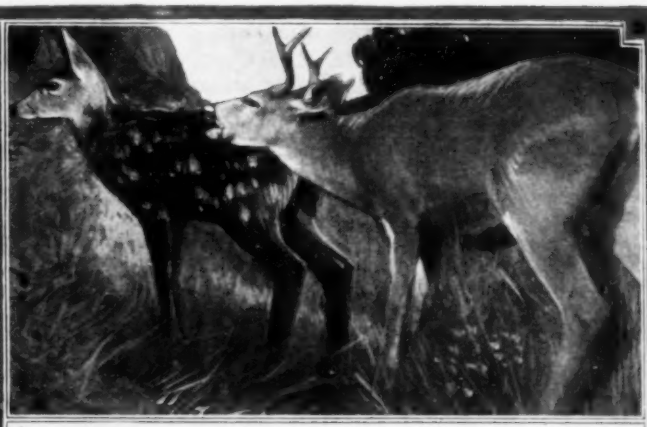
Preparing Food for Large Family of Germs Used in Study of Plant Diseases

where the cookbook is a scientific journal, government experts prepare food for millions of germs used in research work to determine the causes of plant diseases. For this large family, the most precise care must be taken by the chefs, as each group of the germs demands a different dish, specially treated. While the kitchen contains some foodstuffs that do not differ greatly from those cooked by the housewife, it resembles more the workshop of a chemist, with its rows of small glass containers and instruments.

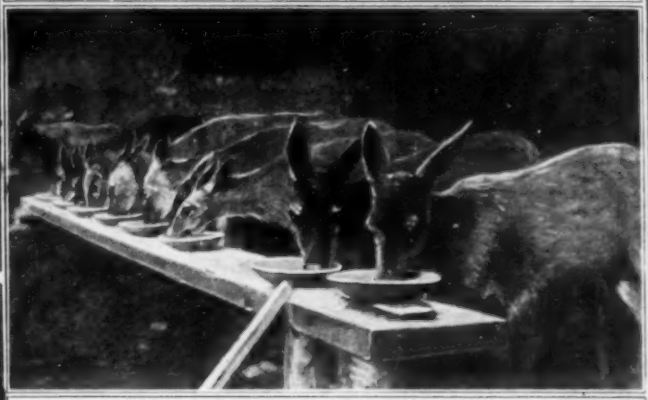
Tubes of cornmeal mixture correspond to the potatoes and other vegetables. Every day almost 6 pounds of beef are turned into an extract by a most intricate process to please the taste of the germs. Instead of by the spoon, the food is measured by drops, and every step taken is carefully recorded for future reference.

Even dishwashing is a task that demands very careful attention. Empty tubes are first immersed in acid to cut away the particles of food that may cling to the sides, then comes an alcohol bath, a rinsing in distilled water, and finally a baking for an hour and a half in an oven heated to 150 degrees centigrade, nearly 240 degrees Fahrenheit. More than 40,000 test tubes are in constant use.

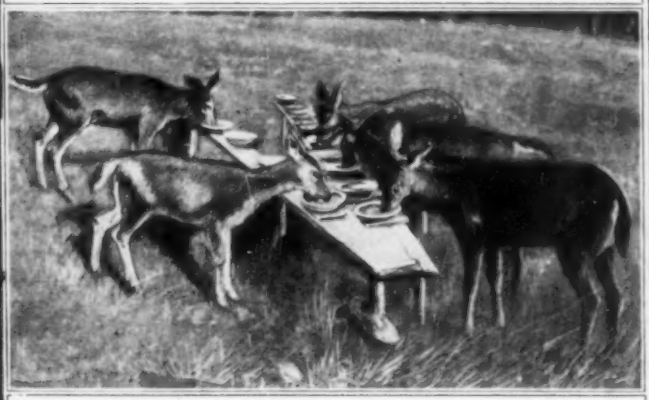
¶ It takes 61 days' work a year to pay the taxes of every producer in the United States, it is estimated. In 1921, taxes consumed 16.7 of all value produced in this country.



Accustomed to the Movements of Their Human Protector, Buck and Doe Await Daily Portions of Fodder



Born on the Island, Fawns Grow Up to Regard It as Their Haven of Peace and Plenty



Board Tables Laden with Bowls of Feed are Frequently Visited by Arrivals from the Mainland

PHOTOS COPYRIGHT, FRANCIS DICKIE

WILD DEER FRIENDS OF EXILE ON LONELY ISLAND

LIVING alone on a tiny island on the British Columbia coast, a wilderness dweller, fond of animals, has succeeded in winning the friendship of a herd of wild deer.

In doing this, he first laid out cornstalks on the paths near his house. Gradually one deer came to accept him as a friend. In a few weeks' time this animal brought another. By the end of a year the two had persuaded five more that here at least was one of the man-beings who could be trusted. The seven soon got quite tame and would come up to the man.

Near the little island is a larger one, which, in turn, is close to the mainland. That animals can communicate with each other is evident, for by the middle of the second year the number of the deer on the island had increased to thirty. The only explanation of this is that the first to make friends must have passed on the word to other wild ones.

Finally, the man decided to build a table with bowls for his visitors. The deer kept increasing, however, in such numbers that he had to build several others, and thus came into existence the first and only "wild-deer restaurant" in the world.

Today, six years after beginning the experiment, there are hundreds of deer upon his island. They come and go as they please, as they have the whole of British Columbia to roam in. But the deer now recognize the place as a sanctuary, and here the little fawns are born in great numbers.

Some of the deer, not satisfied with the food at the tables alone, come to the house and knock on the door with their heads and horns, or rattle the door knob with their teeth, in this way begging for extra delicacies.

In the springtime the front yard is an interesting sight, for nearly always there are a number of deer hanging around, or a few fawns playing about, or sleeping on the doorstep.

INDIANS, BEASTS OF BURDEN, CHEAPER THAN TRUCKS

Because labor is so cheap, Indians in Bolivia, South America, are beasts of burden, trudging along with huge loads at less cost than motor trucks. There are few cars even in the capital, where tiny burros and queer-looking llamas with packs pass up and down the streets, guided by natives, also heavily laden. In this city, founded almost 400 years ago by Spaniards, labor-saving ideas are almost unknown. In digging for a store in the capital, recently, Indian men and women carried away all the dirt in small baskets on their backs.

HOTTEST FLAME KNOWN TO AID IN STUDY OF PLANETS

What is declared to be the hottest flame known to man has been produced by artificial means in experiments held to study the form of atoms. An electric blast, lasting for only a small part of a second, occurring on a charged wire, seemed to explode, creating heat so intense that it could not be measured, although estimates put it at 30,000 to 80,000 degrees. Pictures taken as the explosions occur are expected to aid astronomers in solving the causes for different kinds of light thrown off by many of the planets.

TOY SHOWS REAL MOVIE FILM WITHOUT USE OF SCREEN

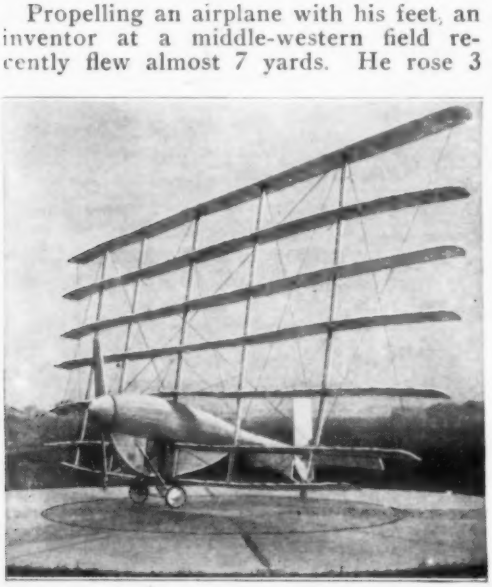
Cut-outs and strips from standard movie films appear lifelike when viewed through a toy recently invented. At one

Tube through Which Cut-Outs of Movie Film Appear Lifelike without Use of Screen

end of a tin tube is a thin piece of glass for a lens. At the other end is a plate across which the movie film passes. Motion is by hand and the scenes are inserted one at a time so that, although the films are duplicates of those thrown on the screen, the figures shown do not move. A large variety of cut-outs is given with each eyepiece. They are taken from films once shown in the movies.

PLANE IS PROPELLED BY FEET IN SEVEN-YARD FLIGHT

Propelling an airplane with his feet, an inventor at a middle-western field recently flew almost 7 yards. He rose 3



Seven-Winged Airplane That Made Seven-Yard Flight Propelled Only by Foot Power

inches from the ground. The flight was said to be the first of any craft moved by foot power. The plane, which is constructed of light materials, was not made for sky trips, but merely to prove that it is possible to fly by pedal power alone, the engineer said.

SUGAR ALCOHOL RUNS ENGINES ON HAWAIIAN PLANTATIONS

Molasses, a waste by-product of the sugar industry in Hawaii, sometimes used as fertilizer and stock feed, is being turned into alcohol to run machinery, automobiles, and tractors on Hawaiian plantations. As a fuel for heating purposes, it is said to leave no sooty deposit, burning with a clear flame, and easily affected by water in case of accidental fire. Most of this sugar alcohol is produced by the plantations in their own distilleries, one of which furnishes enough to run its 32 trucks, 20 passenger cars, and two tractors, aside from supplying the kitchen stoves of hundreds of field laborers. Sugar being the chief crop, gasoline shortage holds no terrors for automobile owners on the islands, as they are not only able to supply all local needs for fuel alcohol, but can make a surplus for exporting. Ether can also be manufactured from the molasses.

VEST-POCKET PHONOGRAPH IS BUILT LIKE WATCH

No larger than an ordinary watch, a gramophone has been invented by a Hungarian engineer that is said to be capable of producing jazz, waltzes, and one-steps. The instrument is wound like a timepiece and fits conveniently in a waistcoat pocket. An inside compartment holds 10 plates that may be played on both sides. In England a midget machine that is only 6 inches high and weighs 4 pounds is being marketed. It has a collapsible horn, takes full-size records, and folds together like a camera.

SCORER FOR CARD GAME AIDS IN AVOIDING MISTAKES

With a device for scoring card games that recently has been invented, there is less chance of making an error in figuring the standing of the players. Made to rest upon the table, the progress of the game can be determined from it at a glance. Although especially intended for auction bridge, it may be used for registering points in other games. Two lines crossing the board at right angles divide it into "we" and "they" sides, the part above

Mechanical Card-Game Scorer Designed to Avoid Errors and to Add Interest to Game

the horizontal line is fitted with two series of numerals on disks, ranging from 0 to 9, that count the honors. Below that line is a similar arrangement for tabulating tricks, with markers to show the first and second, or rubber, games.

AUTO FOR EVERY NINE PERSONS

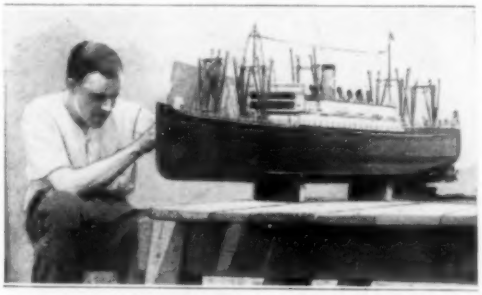
Registration of trucks and automobiles as reported recently indicates that there are now more than 13,048,128 motor vehicles in the United States, an average of one machine for every 8.5 persons. Between July 1, 1922, and July 1, 1923, there was a gain of 2,440,000, almost 23 per cent.

LONGEST ROUTE IS CHEAPEST VIA PANAMA CANAL

Although the longest way may not be the quickest, it has often proved the cheapest since the building of the Panama Canal. Recently a vessel sailed 5,770 miles via the canal to deliver a shipment from one city in South America to another only 650 miles away by air line. Despite the length of the voyage, the charges were less than they would have been if the merchandise had been transported directly overland, because of the almost impassable jungles separating the two points. In another instance it was found less costly to ship lumber more than 8,000 miles by steamer through the canal than to send it to the same destination 2,500 miles by railway. The trip from the west coast, through the canal, up the east coast, and to a middle-western city by rivers and lakes, took more than two months. It even has been found cheaper to send products 1,000 miles by rail to the east and thence by boat through the canal to the west coast, a total distance of approximately 7,000 miles, than to ship them 2,500 miles overland.

MODEL SHIP IS CUT FROM LOG WITH A JACKKNIFE

With a jackknife as his only tool, a mechanic has carved from a single log of cedar, a model of the United States' Oriental liner, "President Grant." Although it is built on a small scale, every



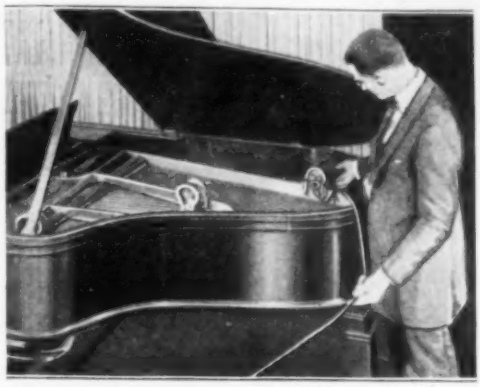
Putting Finishing Touches on Model Ship Whittled with Jackknife from Block of Wood

detail down to the rows of portholes and ventilator shafts, is correctly reproduced. It took thirteen months of whittling to complete the miniature.

¶ Our Bureau of Information will answer all questions regarding articles appearing in this magazine.

TRUE PIANO TONES BROADCAST BY IMPROVED MICROPHONE

Radio transmission of exact qualities of piano music is said to have been made possible by means of a microphone re-



Piano Equipped with Lately Devised Microphone Designed to Correctly Transmit Its Varying Tones

cently developed and now being used in one of the large wireless stations in the East. The device consists of a magnetic system with a coil. The magnet is firmly attached to the frame of the piano while the coil is fixed to the sounding board. In this manner, the tones are correctly converted into electric waves.

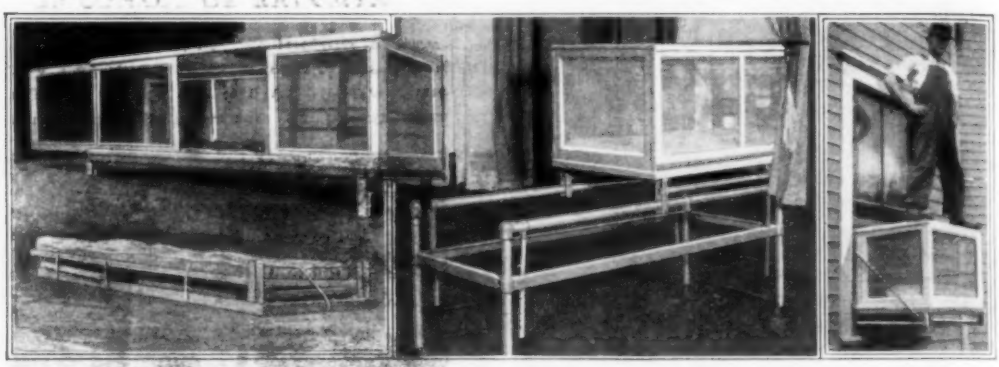
COLD GREATER THAN ARCTIC'S TURNS OUT HELIUM GAS

Cold, many times lower than any temperature found existing naturally on the face of the earth, is used in making helium for the government's balloons and dirigibles. By a secret process, natural gas subjected to tremendous pressure, turns to liquid at 317 degrees below zero, and the helium is drawn off. To change nitrogen gas into a solid would require a temperature of 353 degrees below zero. A piece of raw meat subjected to such freezing would shatter to bits, if dropped on a hard floor, while a pencil would burst into splinters.

QUICK-CHANGE SCREW DRIVER HAS BLADES IN HANDLE

For use in the shop or home, a screw driver is being made that has three different blades in its handle. Any one desired may be set in working position when the tool is tipped up. A turn of the handle locks it in place. By reversing the operation, the blades are retracted.

FOLDING BED PROJECTS OUT OF THE WINDOW



Left: Bed Folded for Use With Camping Outfit; Center: Metal Frame on Which It Rolls Through Window; Right: Man Testing Strength of Chains Holding Bed

For outdoor sleepers, a screened bed that can be suspended out of a window and held safely in position by heavy chains, has been invented. When not in use, it rolls back over a metal frame equipped with casters that permit it to be moved with ease to any part of the room. In the house the bed can be used as a davenport, or it can be detached from the frame, folded up, and carried with a camping outfit, short legs being provided to support it.

AERIAL TORPEDO IS CALLED BLOODHOUND OF THE SKY

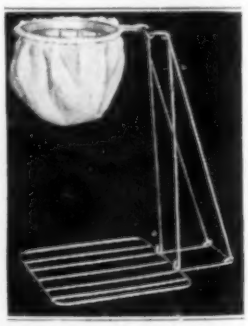
Because it actually trails the sound of an airplane motor and explodes on reaching the craft, a torpedo recently invented is called "the bloodhound of the sky." Shaped like those fired from vessels, it is driven by liquid air. The operator, locating the noise of an airplane's engine by radio, launches the torpedo by pulling a trigger to release the turbine in the missile. With a roaring swish it takes to the air, pointing upward at first, and then turning straight toward the target. When the device strikes, an explosion of terrific force results. During a test one tuned to a motorcycle engine demolished the machine.

MOUNTED "DUMMY BOY" KEEPS RAILWAY TRACKS CLEAR

Flagmen, mounted on horses, still ride ahead of trains on Tenth Avenue in New York to warn walkers and automobile drivers of the approach of locomotives. When required, they halt a train at a crossing by stationing themselves in front of the engine. In these days of electric-signal systems and other similar inventions, people stop and look when a rider, known as a "dummy boy," passes down the track. This system of signaling which was employed to announce the approach of the first steam train, passed out of general use about 100 years ago.

FOLDING JELLY-BAG STRAINER SAVES MANY STEPS

Fashioned from wire so that it will fold, a jelly-bag strainer being marketed rests on any flat surface, and may be placed near the stove within easy reach of the cook, thus eliminating many steps. As all parts are accessible, it can be quickly cleaned. The bag may be replaced when worn, making the device serviceable through several canning seasons. While in use, the receptacle is kept from tipping by a wide base.



¶ Before mummies came to be regarded as objects of value for museums, many were pulverized and turned into a brown paint.

More than a Million Loaves for Every One that Grandmother Used to Make

How Science of Baking Bread Has Progressed Since Days of the Log Cabin, Lifting Burden of Toil from Women

FROM the log cabin, with its great, open fireplace, to the modern steam-heated, electrically lighted apartment seems a long journey, but it was made in much less than 100 years.

Until 15 years ago, bread was baked by hand in a way that had been passed down from prehistoric days in almost unchanged form. At that time, with few exceptions, none of the machines now used in the baking industry had been invented.

That is why bakers themselves like to call their industry "The newest-born babe of Mrs. Machinery." In one middle-western city alone, they make approximately 9,000,000 pounds of bread and rolls weekly, supplying more than 60 per cent of the total amount consumed.

For every loaf that mother used to make, great machines now turn out a million, and, according to food experts, the product is more uniform and better in every way.

When thin lines of pioneers from the New England states first turned their creaking, ox-drawn wagons toward the forests that covered all of the territory west of the Appalachian Mountains, bread-making was an art involving almost endless toil.

All of the cooking for the families, which usually were large, was done over open fireplaces, servants were unknown, and the housewife not only prepared the food, but carded the wool and wove all of the clothes used in her household. The usual workday began with dawn and ended with darkness, which found the fire banked and all of the household in bed.

Pioneers still living tell of having been forced to walk miles through snowdrifts to the nearest neighbor for live coals to rekindle a fire that had gone out during the night. Matches, of course, were unknown, and steel and flint were rare. Once lighted, the fire on the hearth was constantly watched, as it often spelled tragedy for the settlers when allowed to die out.

Such a thing as an 8-hour day was unknown for anyone, the men toiling as long as there was light, while the women molded candles and musket balls for hunting, and worked in their gardens, after their other tasks were finished.

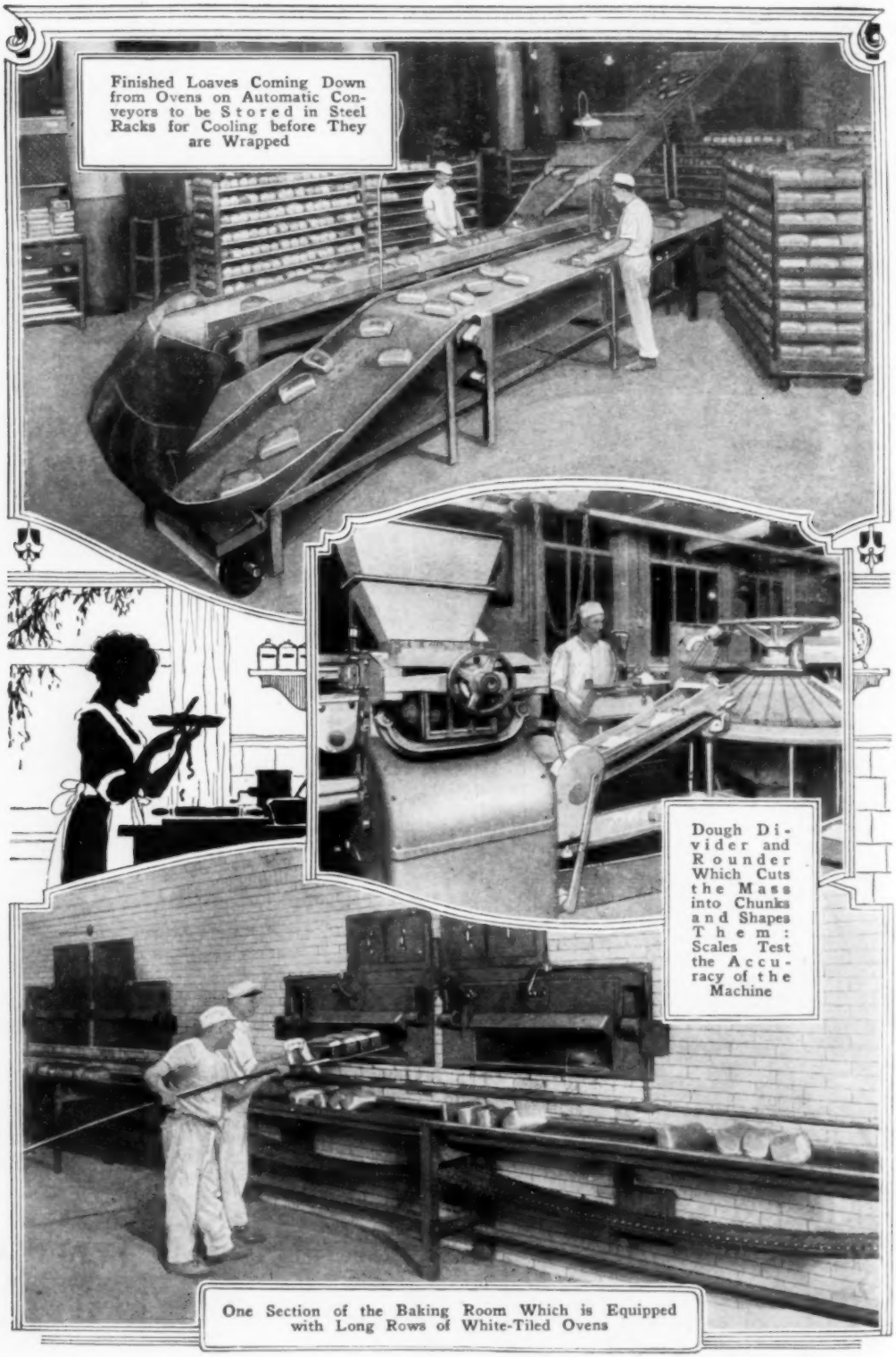
Meat was cooked on spits turned before the open fire, and vegetables stewed in pots swung over it. Bread was baked in pans placed in the glowing coals or in ovens built into the sides of the fireplaces, and flour was usually ground from wheat on crude hand mills, as it was needed.

Today large wholesale baking plants supply entire cities, their forces of white-capped workmen beginning in the early evening and working through the night so that their product can be delivered fresh for the breakfast tables by fleets of motor trucks.

In the development of great bakeries, some of which do the work formerly performed by 200,000 women in the homes, research laboratories have been established to reveal the secrets of transformation in the baking process. Here chemists grow colonies of yeast germs and seek cures for all the troubles to which flour and bread are prey.

Machines used in the industry do away with handwork almost entirely. They mix the dough automatically, send it

MAKING BREAD FOR MILLIONS AS CITY SLEEPS



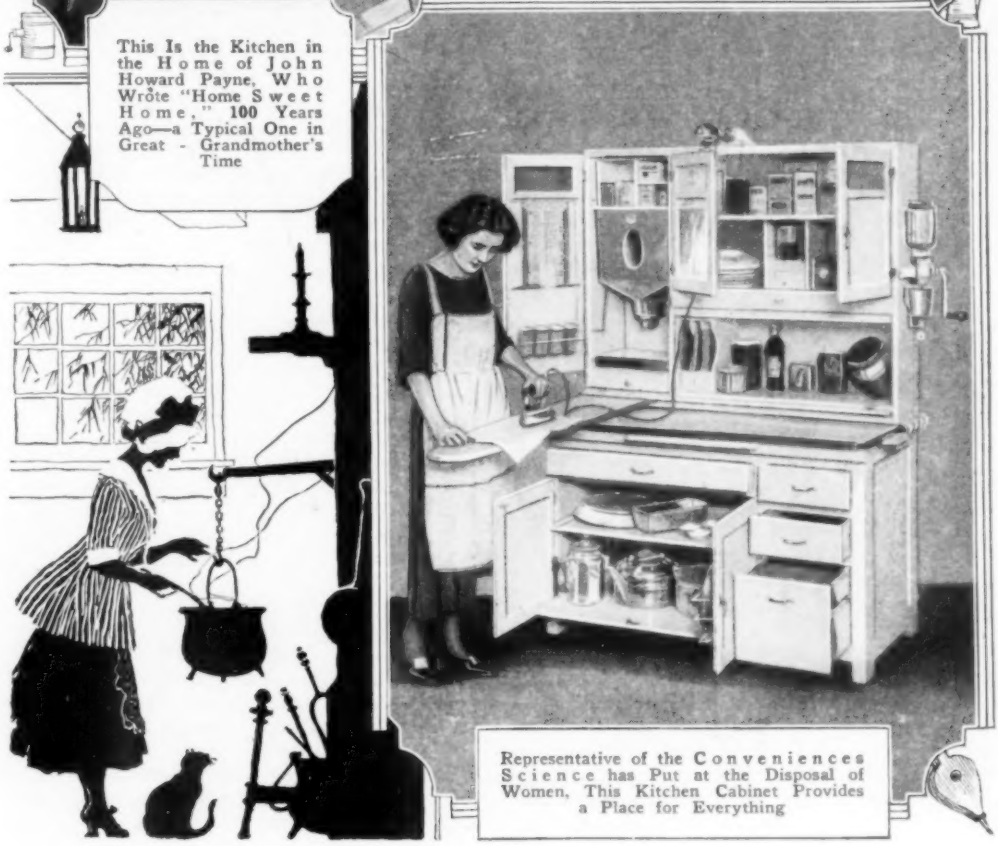
Finished Loaves Coming Down from Ovens on Automatic Conveyors to be Stored in Steel Racks for Cooling before They are Wrapped

Dough Divider and Rounder Which Cuts the Mass into Chunks and Shapes Them: Scales Test the Accuracy of the Machine

One Section of the Baking Room Which is Equipped with Long Rows of White-Tiled Ovens

WOMAN'S WORKSHOP OF YESTERDAY AND OF TODAY

This Is the Kitchen in the Home of John Howard Payne, Who Wrote "Home Sweet Home," 100 Years Ago—a Typical One in Great - Grandmother's Time



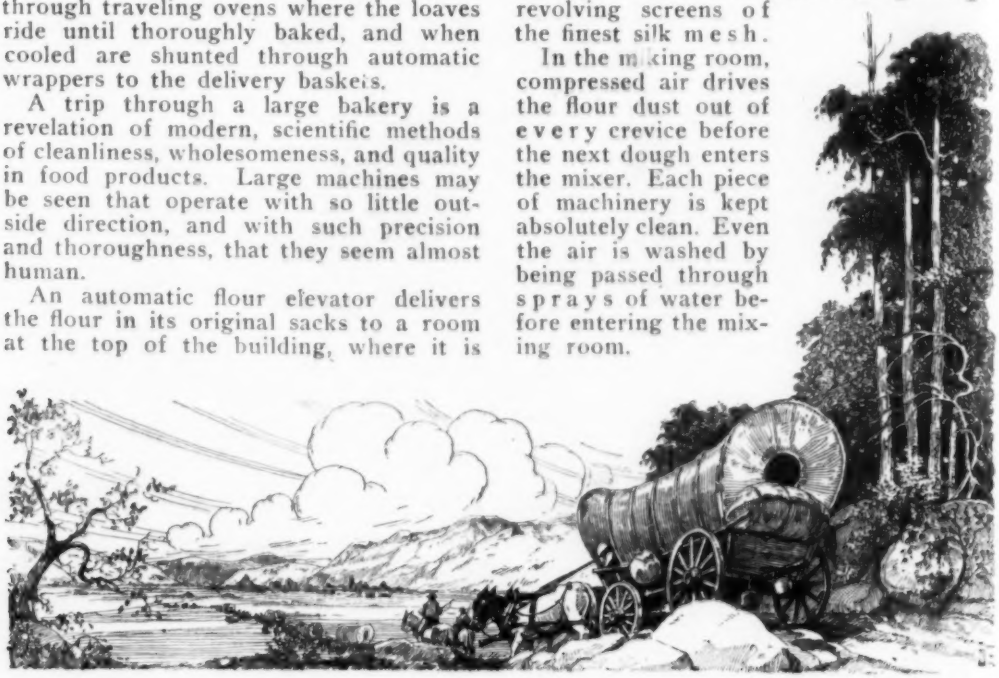
Representative of the Conveniences Science has Put at the Disposal of Women, This Kitchen Cabinet Provides a Place for Everything

spinning along through loaf cutters, rounders, and proofers, and carry it through traveling ovens where the loaves ride until thoroughly baked, and when cooled are shunted through automatic wrappers to the delivery baskets.

A trip through a large bakery is a revelation of modern, scientific methods of cleanliness, wholesomeness, and quality in food products. Large machines may be seen that operate with so little outside direction, and with such precision and thoroughness, that they seem almost human.

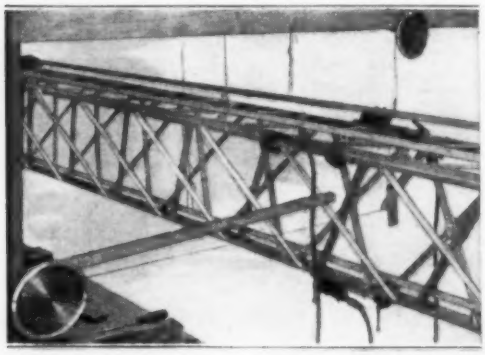
An automatic flour elevator delivers the flour in its original sacks to a room at the top of the building, where it is blended and mixed. It then goes to the bolting reels and is sifted through large revolving screens of the finest silk mesh.

In the mixing room, compressed air drives the flour dust out of every crevice before the next dough enters the mixer. Each piece of machinery is kept absolutely clean. Even the air is washed by being passed through sprays of water before entering the mixing room.



SAFETY GAUGE GIVES WARNING OF WEAKENED BRIDGES

Bridges of the future may be supplied with recently invented strain detectors as permanent equipment, to guard against excessive stresses and danger of collapse.



Strain Gauge for Detecting Weak Braces, Clamped in Position on Girder for Airship

On metal rods, braces, and beams regularly exposed to heavy loads, the recorder will give warning of weakened parts in time for inspection and repair to prevent accidents. Clamped on the girders, the device records strains by means of two sets of carbon blocks whose resistance to electricity is raised and lowered by pressure. If the strain is in one direction, pressure on one set of blocks is increased, and if the pull is reversed, it affects the other set, causing corresponding variations in dial readings.

MAN AN ELECTRIC MACHINE, IS THEORY OF DOCTOR

Likening the brain and liver to positive and negative poles of an electric battery, a scientist recently advanced the theory that the human body is a machine without a soul, driven by electricity and controlled by the strong emotions, which act as levers. Nerves are regarded as connecting wires. The supporter of the idea asserts there is much evidence to show that men and animals are constructed of component cells, each of which is an important "electrochemical" part. Sleep is explained by this theory as the period when the voltage used in driving the battery is being restored.

¶So keen are the organs of smell in a vulture and a carrion crow that they can scent their food for 40 miles.

WOLVERINES IN FINAL STAND IN WILDS OF SIERRAS

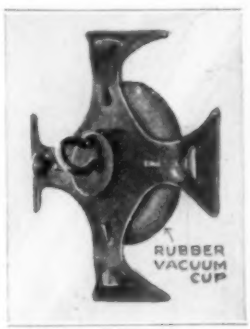
Driven from other parts of the country, many wolverines inhabiting t e wilds of the Sierras, whose appetites cause them to eat porcupines, are being killed off by the quills of their victims. These strong, heavy beasts often follow the lines of fur-trappers, eating and destroying the catches.

WOOD IS TURNED INTO MILK THROUGH CATTLE FODDER

Old paper, cardboard, and sawdust are being made to yield milk and beefsteak in Europe as a result of a discovery of a scientist by which those articles are turned into a substitute for fodder. Treated with chemicals, a quantity of paper is passed through a machine and emerges as varicolored flakes or strings resembling macaroni. This, mixed with the usual foodstuff, not only supplements it, but the cattle like it, and, seemingly, thrive on it. Reports state that the milk is improved both in quality and quantity. Thousands of tons of sawdust are turned into animal fodder also.

VACUUM CLIP FOR WINDOWS HOLDS DISPLAY CARDS

As a substitute for gum stickers, a vacuum clip has been made that provides a neat and clean way of holding posters, announcements, advertisements, and price tags on store windows or showcases. By moistening the face of the rubber cup and pressing it firmly against glass or any smooth, non-porous substance, it will cling so tightly that it will support a weight of 10 pounds. Inserting the finger nail under the cup releases it. Thus it is possible to display cards or posters on surfaces where it would be impossible to drive tacks, or where glue would leave an unsightly mark. It also may be used in suspending glass shelves for exhibiting jewelry or novelties. In the home it is handy for holding curtains, ice cards, and rent and "for sale" signs.



GRASSHOPPER TRAP IS HAULED OVER FIELDS BY MULE

To rid his farm of plant-destroying grasshoppers, a man in the middle West has designed a moving trap. On either side of a frame, he placed wings, which he paints with a thick coat of soft pitch. A mule hauls the device over the fields, disturbing the insects which jump into the air, and are caught as they strike the sticky substance. The wings are scraped off, when they become covered with the pests, and more tar put on.

Moving Trap with Pitch-Covered Wings that Catch Grasshoppers as They Jump from Its Path

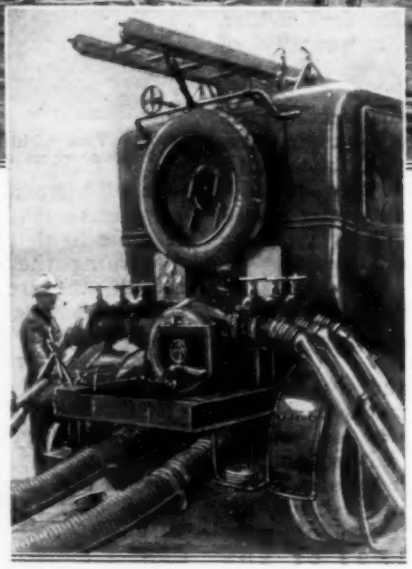
EGG IS CUT INTO NINE PIECES WITH STROKE OF SLICER

With one stroke, a slicer, recently patented, cuts a hard-boiled egg into nine thin layers for salads, sandwiches, and other uses, by drawing fine wires through it. To protect the delicate wires from damage they may be lowered beneath the frame when the device is not in use. Another similar device is being manufactured for the cutting of bread into thin slices.

¶ To encourage the adoption of the American national game, the government printing office of the state of Yucatan, Mexico, has translated baseball rules into Spanish.

GIANT FIRE ENGINE FEEDS MANY PIPE LINES

Above, Making Flood Big Enough to Cover Ordinary Building



Right, Fire Engine That Feeds Twenty-four Lines of Hose

With a powerful engine that feeds 24 lines of hose, a giant fire truck has been tried in France. Congesting of streets with fire-fighting apparatus will not be necessary when this monster is used. Two intake pipes connected at the bottom of the engine supply hose attached at the front and back of the truck. In a recent test, 24 men with fire hose, lined up on a river bank, created a curtain of water 100 feet long and almost as wide. By using extending intake lines, the truck can be stationed far from the water plug and develop pressure enough to cover an ordinary-sized building with a flood of water. The machine's heavy base supports an extension ladder.

ANCIENT, FIRE-SWEPT CITY FOUND IN RIVER BED

Charred remains of a beautiful Indian city, believed to have been destroyed by the fire of enemies long before the advent of the white man in America, were discovered recently in a river bed in the South. Temples and terraced hills bore mute testimony to the splendor of a long-forgotten people. Charred woven reed tapestry was found under an overturned wall. In the center of the city, the original summit of a great hill had been cut away to form a level plaza 1,000 feet in length and 500 feet in width. Around the edge of this space were built small mounds and earth lodges of sun-baked clay. It is believed that several thousand persons once lived in this forgotten city.

BEETLE'S GLOW LIGHTS ROOM

In the wilds of Costa Rica, large beetles have been found recently that emit an almost continuous light so brilliant that one or two of them, imprisoned in a glass, will illuminate a large room sufficiently to make print readable. Although the color of the glow is mostly yellow, it differs with individuals, some casting green or ruby shades.

ALL WOMEN ARE BARRED OUT OF MONASTIC REPUBLIC

It is unlawful for a woman to set foot on Athos peninsula, in Greece, where monks of the Greek church live. Eggs, milk, and other farm products, are brought from across the border for the 20 walled-in monasteries built on the steep slopes of Mt. Athos. Outside the inclosures are olive groves, fruit orchards, and vineyards, worked by the monks and lay brothers, who maintain a republican form of government.

TEN-THOUSAND-YEAR-OLD BONE HARPOONS ARE FOUND

Belonging to the time of prehistoric man, two bone harpoons, one four and a half inches long and the other 10 inches, have been dug from a peat bed in Yorkshire, England. The peculiar markings on the weapons show them to be the work of Maglemose men, people supposed to have lived 10,000 to 20,000 years ago in a place in Denmark called Maglemose, where many relics of the ancients have been discovered.

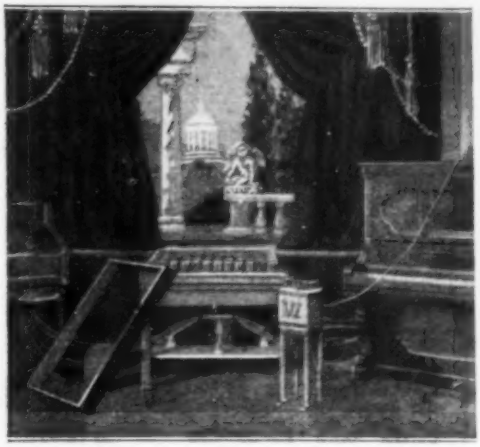
HOUSEHOLD REMINDER KEEPS TAB ON SUPPLIES

When groceries should be ordered, red arrows are pointed at the required items named on a household reminder recently patented. On a metal frame that hangs in the kitchen are listed 52 kinds of supplies, from almonds to wax. Beside each name is a white arrow. When things are needed, the proper arrow is turned over so that the red side appears as a warning. Thus the busy woman is saved time in preparing her marketing list.

¶ Flood lights that flash out part of the name of the landing field in the telegraphic code are being used at an eastern air station to guide airplane and dirigible pilots at night.

COLOR MUSIC RIVALS HUES OF SUNSET OR RAINBOW

Color music, or the production of constantly changing hues like the shades of a rainbow, is the feature of an invention of an Australian. Organ or piano keys

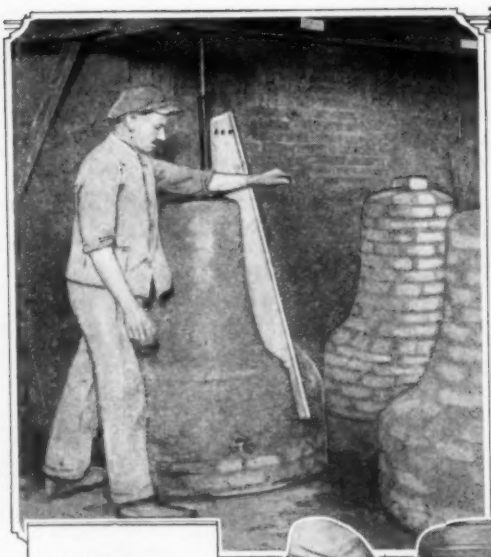


Piano Equipped with Device That Flashes Brilliant Colors on Screen When Played

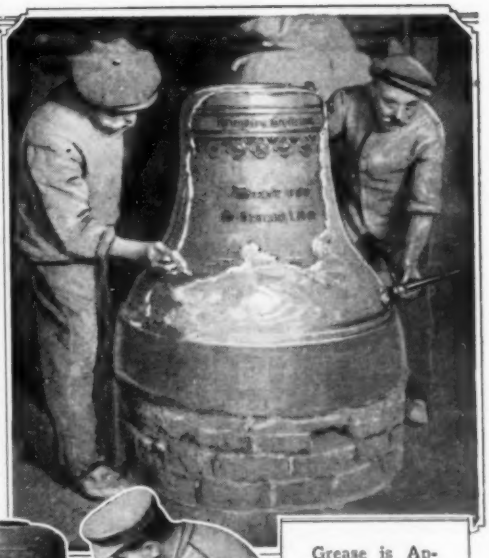
are connected by electric wires with a series of incandescent lights that are illuminated when the instrument is played. Bass notes control darker tints than those produced by the treble notes. Pneumatic control is used for varying the intensity of the lighting in accordance with the force or lightness with which the keys are depressed. The globes are inclosed in reflectors, in front of which are placed screens of varying hues. To produce pleasing shades, there are interposed palms, flowers, rocks, and figures between the lamps and a white screen. Alternately, the bulbs may be made to project their rays on a semiopaque glass.

FOLDING HANGER FOR CLOTHES KEEPS SUITS IN ORDER

Designed to conserve space in a crowded wardrobe and to store garments in an orderly fashion, a clothes hanger that may easily be installed in a wardrobe or closet has been patented recently in England. The device attaches vertically to the wall or door of the receptacle and holds suits, coats, and dresses flat and free from creases. To put clothing away, an arm with notches, each receiving an outfit's individual hanger, may be swung outward and then returned to its normal position and locked in place.

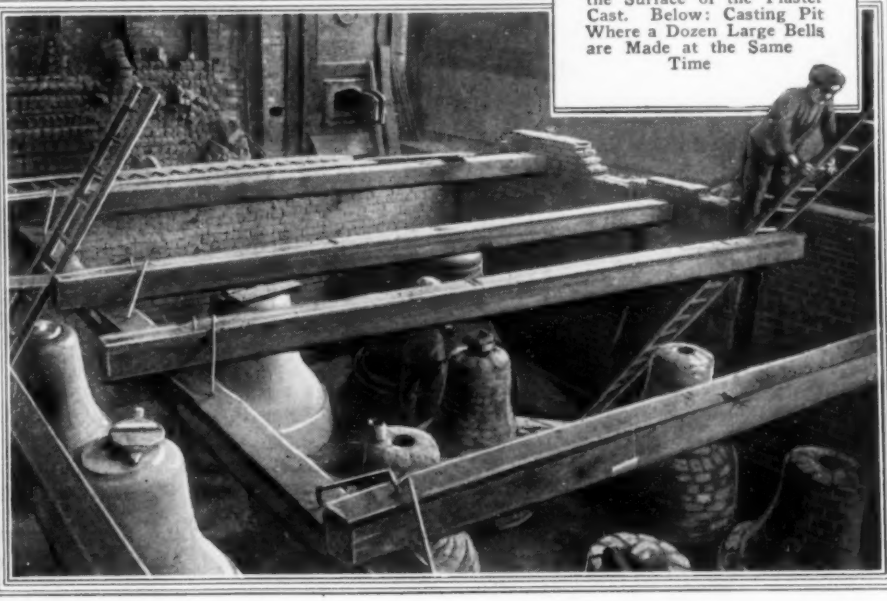


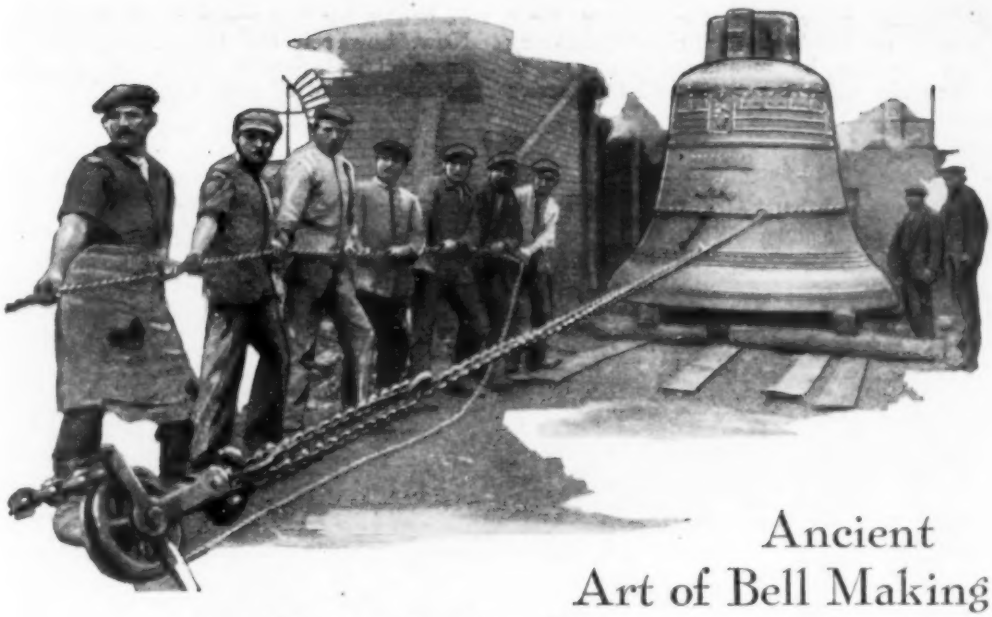
In Shaping the Core to Form the Inside of the Bell, the Curved Board is Drawn over a Layer of Soft Clay



Grease is Applied to the Plaster Cast of the Bell, So That the Clay Molds can be Easily Removed When Hardened

Above: Placing Ornamental Designs of Wax on the Surface of the Plaster Cast. Below: Casting Pit Where a Dozen Large Bells are Made at the Same Time





Ancient Art of Bell Making Records the Progress of Mankind

SINCE the first dawn of civilization all of the terror, sorrow, and joy of mankind have been voiced through the brazen throats of bells.

For more than 1,500 years they have heralded the crash of falling empires, the birth of new nations, wars, revolutions, catastrophes. Sometimes clamoring in wild alarms and then again pealing out messages of good will, their notes have marked every page in history.

Evolved slowly through the ages from the great gongs used to call together members of a tribe, bells have been made of many metals and their construction has taxed the skill of artisans for countless generations. They also have influenced architecture, lofty towers and steeples being built to house them as they increased in size.

Like many other things which have come down through long years of change, bells have been made in many shapes. Long, narrow ones, square and low, preceded the gracefully curved, trumpet-mouthed type designed about the 16th century, many of which still exist to charm the ear with their soft, sweet tones, carried from afar.

Some of the earliest bell makers traveled about, setting up their foundries and casting bells wherever they were desired. Later, as the size increased and the means of transportation were improved, central manufacturing plants were established where large molds could be built.

In making a bell, it is first drawn on paper. Then two wooden legs are made, the underside of one curving to the shape of the bell's inner shape, while the other leg conforms to its outside surface. These legs are pivoted to the top of a stake driven into the ground, around which is built a brick cone. This is covered with soft clay and the first leg run around it, shaping it to the inside of the bell.

Grease is smeared over the form, another coat of clay added, and the second leg drawn over it, forming a complete plaster cast of the bell. This also is greased and the entire mass covered with another layer of clay. When this is dry, it is lifted off and the inner shell removed. After the cover is replaced, the melted metal is poured into the mold to form the bell.

First used singly, bells of many sizes were combined later in groups to produce various effects, from the faint, musical tinkle of the clock to the deep-toned, cathedral chime.

As years passed, the number was increased so that the playing upon them of complicated musical compositions became possible. A variety of tones was made possible by changing the composition of the metal of which they were cast.

In the early days the chimes were played by hand, the bell-ringer swinging the tongues by means of long ropes. Then the ropes were attached to a series of pedals for the operators' convenience. Now, however, the bells are played by an electrical device giving the greatest possible range of tone effects.

STEAM OF NATURE'S BOILER HARNESSED FOR POWER

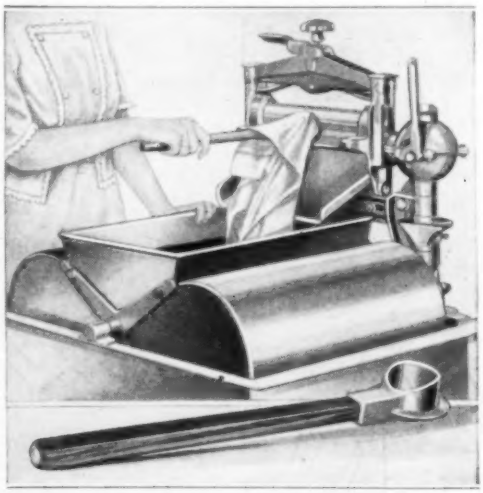
In a quest for cheaper power, engineers have long been engaged in attempts to shackle the earth's internal energy. Experiments are being conducted in a region called the "hot belt" of northern California and Nevada, to learn the possibility of harnessing the steam that is there generated. By drilling into the ground a pressure of from 30 to 70 pounds has been received at the surface. Already one engine is using underground power and experts expect to pipe this low-cost energy over a large radius. Electrification of railroads in that territory and extraction of carbonic gas from the steam for preserving shipments of fruit are regarded as future steps. Since 1904, northern Italy has been supplied with electricity produced by engines driven by such underground steam power.

SMUTLESS WHEAT NOW GROWN TO INCREASE YIELD

After ten years of experimenting, scientists in a western college have found a way to grow smutless wheat. Tests on an acre of grain showed less than one-tenth of 1 per cent of smut. Farmers who visited the field declare it will provide 40 bushels to the acre. The discovery, it is believed, will result in a larger production and less loss by damage to threshing machines. By various processes, the scientists destroyed the texture from which smut grows.

WRINGER FEEDER CUTS RISK OF CRUSHED FINGERS

To remove the risk of crushing fingers in a clothes wringer, a handle with rounded ends for placing material between the rollers has been invented. It is unnecessary to have the hands near moving parts of the machine when this feeder is used.



How Clothes are Placed in Wringer, and, Below, Handle That Lifts Pieces to Rollers

MILLION WASPS ARE FREED TO WAR ON CROP PESTS

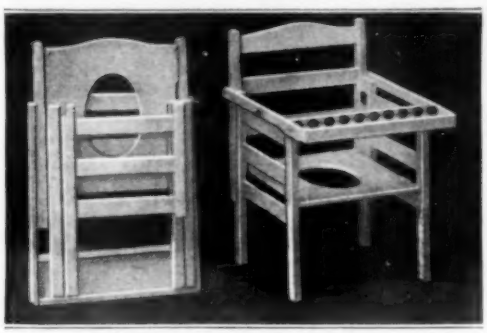
One million wasps, the size of pinheads, have been imported by the government and are now distributed in the East to destroy the corn borer. The wasps will save millions of dollars in crops for the farmer, if they serve as well as they have in Europe. Whether they can flourish in this climate has not been determined. The borer, resembling a caterpillar, attacks corn, beets, celery, beans, rhubarb, potatoes, buckwheat, clover, and many other products. By laying eggs on it, the female wasp kills the borer.

U. S. DYE INDUSTRY'S GROWTH BREAKS ALL RECORDS

Since 1914 the dye industry in the United States has increased its production almost ten times. Now American dyes supply 93.5 per cent of the color used in this country for cloth, paper, leather, hats, inks, polish, food, and many other things. The number of makers has increased from seven in 1914 to 87. The amount made in this country in 1914 was more than 6,000,000 pounds. Last year it was 64,632,187 pounds. Dye experts on a research staff of chemists are constantly engaged in bringing out new colors and new processes.

FOLDING CHAIR FOR BABY SAVES NURSERY SPACE

Space in a crowded home is conserved by a baby chair that is made to be folded up and placed out of the way when not in use. For the entertainment of the child, a row of colored beads is fastened to a rack that locks it in the seat.



When Not Needed This Baby Chair May Be Folded Up and Put Away

GRIM FIGURE OF UNDERTAKER IS WARNING TO CARELESS

To warn pedestrians of the danger of crossing a street against traffic, Detroit has tried the experiment of erecting queer signs, fashioned after the figure of a giant man. These are put on corners where fatalities or serious injuries have occurred. The striking figures, almost ten feet high, hold in their hands a card that calls attention to an accident that has happened at the locations where they are placed. Black crepe cloth is fastened to their hats and swings in every passing breeze as a grim reminder to "jaywalkers." It is said that very good results have been obtained by their use, as the quaint figures never fail to attract the eyes of the passers-by.

INDOOR GOLF COURSE OF FELT TEACHES HOW TO PUTT

For entertainment as well as instruction, a golf course for playing indoors has been placed on the market. It teaches beginners correct stance, grip, and putting stroke, and permits the accomplished golfer to practice at home. The hole is similar to that of an outdoor putting green, while the "course" is of smooth felt, so that the ball will roll in the proper direction. As there is a trap behind the cup, a natural stroke may be used without danger. Grown-ups play with regular clubs, while children use smaller ones.

OVER FOUR BILLION DOLLARS IN GOLD IN AMERICA

Believed to be the largest amount of gold the world has ever known, there is in the United States, now, $4,025,000,000 worth of the yellow metal. This is $300,000,000 more than the country had a year ago.

¶ Mine explosions are said to be prevented and foul air purified by spraying the shafts with a liquid recently discovered by an English miner.

INVALID CHAIR FROM ROCKER PLACED ON WHEELS

Any rocker can be made into an invalid's chair by placing it on a patented metal frame fitted with wheels. Chair

Invalid with a Rocker Made into Wheel Chair by Clamping to Metal Frame

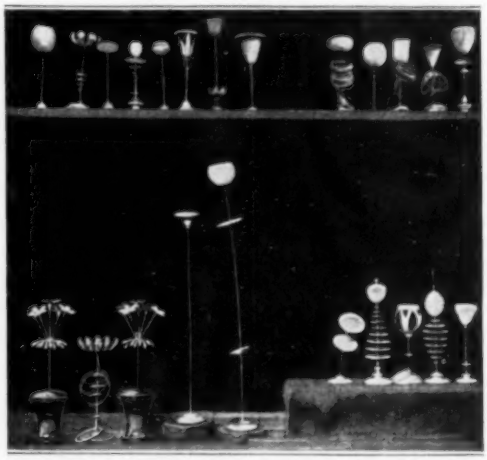
legs or rockers are firmly clamped to the base without marring the wood. Steering is made possible by small wheels at the back, which turn at any angle. As it requires little space, it can be carried easily.

CITY OF BURIED PAST REVIVED FOR VISIT OF KING

After being buried for many centuries on the lower slopes of Mt. Vesuvius, Pompeii again has taken on the glory of its past. Water still plays through pipes 2,000 years old. Fish swim in the original marble bowls. Vines and shrubs decorate the pergolas, just as they did in the days when Julius Caesar landed in Britain and London was a forest. Fresh roots recently replaced the ancient ones. For 12 years scientists have been clearing away débris covering one narrow street in the buried city. After digging a few inches at a time, they picked off the ashes and dirt by hand. When the slightest trace of a building appeared, they summoned experts who delicately removed material, strengthening the arches or pillars with cement, inch by inch. In one house the smoke of a lamp is still seen and the roof is covered with the same tiles that sheltered the long-dead owner. Advertisements, painted in red and white, election notices, and other posters still remain on the walls. Everything has been restored, as nearly as possible, to its original form in anticipation of a visit from the king of Italy.

WOOD CARVING REVEALED AS DYING ART

Flowers, cups, goblets, and vases, turned and carved in wood by hand, are fashioned with realistic effect by a European artist. His is almost a lost art because machine methods have largely replaced handwork. From remotest ages carving of wood has been a foremost craft, believed to be of greater antiquity than working of ivory. It reached its zenith in glories of the 15th-century cathedrals. To carve in wood is said to be even more difficult than marble sculpture, because wood expands and cracks with changes in temperature and is often injured by insects. Failure to fashion the more delicate parts of a design with the vein may result in damaged work. Fragile petals and thin stems

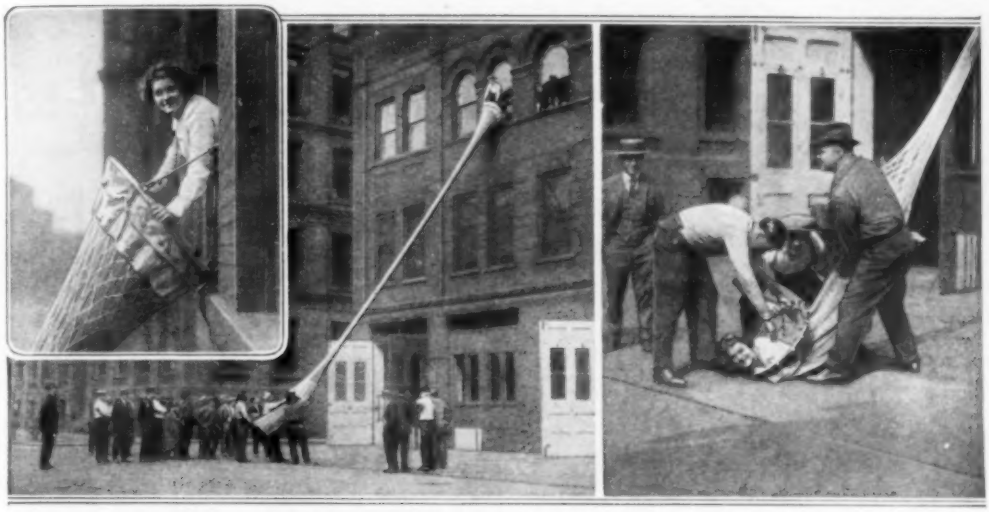


Wood Carving of Delicate Parts and Thin Stems That are Turned by European Master of a Dying Art

arranged across the grain in reproducing a flower may break, owing to expansion of the wood fibers caused by moisture.

¶Scientists are contemplating experiments to determine whether seeds removed from the tomb of King Tutankhamen, in Luxor, Egypt, still retain life after their long burial. Powerful electric lights will be used in the tests.

FIRE VICTIMS TO SLIDE THROUGH SILK TUBES



At Left: Start of Plunge Through Silk Tube from Window; Center: Men at Bottom Controlling Speed by Grip on the Net Cover; Right: A Slide to Safety

For saving the lives of persons trapped in burning buildings, a long, silk tube, inclosed in strong netting, has been designed. Attached to a window, the victims may dive through it to safety. Firemen in the street control speed of the falling body by holding taut or loosening the bag at the bottom of the net. In a recent test, firemen leaped from a third-story window, and a young woman plunged head-first through a forty-foot tube. Invented by a middle-western man, it is made in various lengths to be fastened to any window in a building several stories high, after hooks have been placed in the frame.

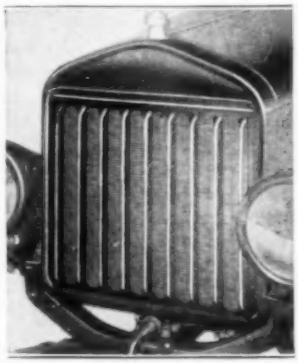
FOUNTAIN OF ETERNAL LIFE DESCRIBED IN LEGENDS

Indian carvings signifying perpetual life, found on the rocks through which flow the hot springs of the Rio Grande Cañon, have caused much speculation recently as to whether the site is that described in legends of the extinct Aztec race which told of spouting waters that brought never-ending youth. Natives have named the place Wa-pu-me, meaning the Spring of Life, and for years have bathed there. Near by are ruins believed to be the remains of the ancient city of Mecitil, founded by Aztecs who marched northward from their former home and settled near springs reported to possess the power of preventing old age. History records the efforts of the early Spanish explorers to confirm these stories which resulted finally in the occupation of what is now New Mexico.

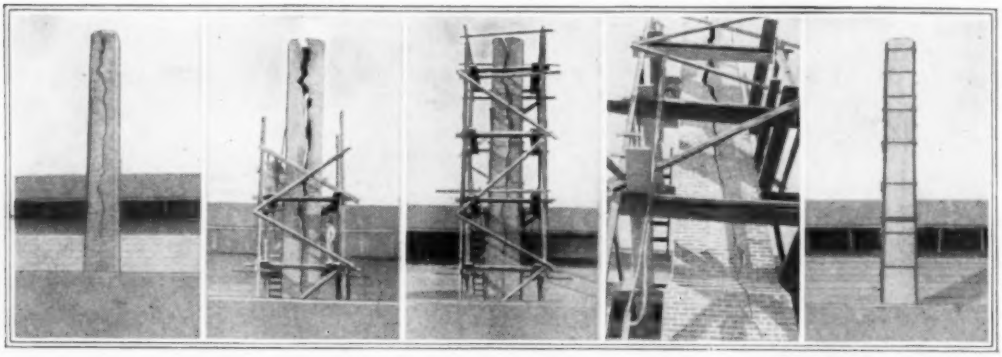
¶Of all the states, Florida has the most water within its boundaries, totaling 4,440 square miles.

METAL FRAME PROTECTS AUTO RADIATORS FROM DAMAGE

To prevent damage to automobile radiators, a metal frame that may be attached to any car in a few moments, has been marketed. Heavy bars widely separated so they cannot interfere with radiation, receive the heaviest part of any shocks occurring in head-on collision. The device, strongly constructed, is enameled to correspond with the color of the body, and adds to its neat appearance. It requires no attention after once being placed in position.



SPLIT STACK TIED TOGETHER WITH IRON BANDS



PHOTOS FROM HERCULES POWDER CO.

Crack as It First Appeared; the Wider Gap Produced by a Slight Earth Tremor; and the Chimney after the Halves Were Drawn Together by Iron Bands

Cracked by the expansion of acid vapors, a 50-foot chimney at an eastern powder plant recently was tied together with iron bands. The stack served to carry off waste gases from the chamber of an oil-heated furnace. Breaking of pans in which material used for the recovery of sulphuric acid is heated, allowed the gas to flow into the crevices of the bricks, and, because of its enormous spreading and lifting power, caused the chimney to split into halves. A slight earth tremor completed the process, leaving the right half of the chimney separated from the left by a foot, and in such bad condition that a heavy wind would have toppled it, probably resulting in damage to nearby apparatus. To quickly and economically draw the parts together again, workmen placed metal bands at each corner and welded them in place with iron rods.

Starting at the bottom, they gradually drew the halves together again, the right swinging into position as bolts in the rods were slowly tightened, while the left remained stationary.

The work was accomplished without accident, and the stack now is expected to last at least the life of its iron bands.

BRACELETS FOR HORSES KEEP THEM SAFELY "HITCHED"

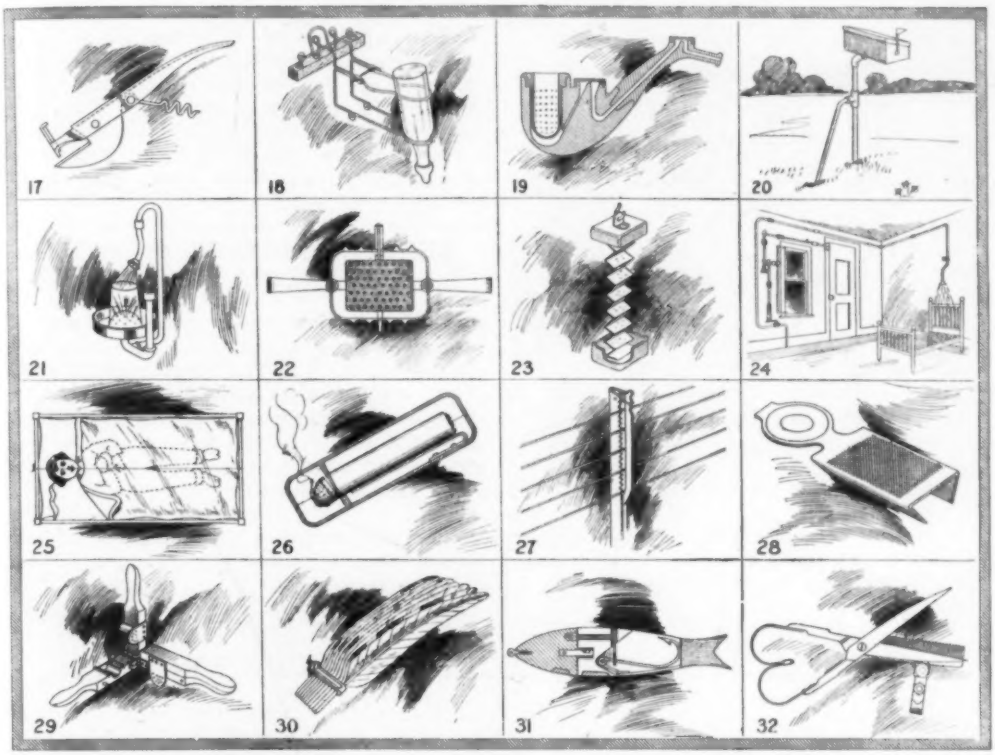
As few of the larger cities still have the once familiar hitching racks for horses, teamsters and drivers must find other means to meet the need. One of the methods now employed to prevent a horse from wandering or running away, is to shackle him with "footcuffs," or leather bracelets. With the device fitted snugly around his forefeet, the animal cannot move far without throwing himself. Fastened with a snap, it is quickly removed, and can be kept under the seat of the vehicle.

Leather "Footcuffs" Placed on a Horse's Feet to Keep Him from Running Away

LOCUSTS EATEN BY ISLANDERS

Although they destroy crops, locusts are highly regarded as food by natives in the Philippine Islands. When the swarms fill the air, looking like snowflakes, all sorts of nets are used to gather in the harvest. To prepare for a meal, they are put in a sack and soaked in hot water. Then they are cooked or fried, the legs and wings being pulled off. In one province recently, 1,500 sacks of the pests were caught during one swarm. Men, women, and children joined together in a small army to catch the insects.

These Articles Are for Everyday Use But— Can *You* Name Them?



JUST to help you, the use for which the articles are intended is as follows: No. 17, in the home. No. 18, in the home. No. 19, for man's use. No. 20, in the country. No. 21, in the home or restaurant. No 22, in the wilds. No. 23, in the home or office. No. 24, in the home. No. 25, in the home. No. 26, for man's or woman's use. No. 27, on the farm. No. 28, anywhere. No. 29, in the home. No. 30, on the farm. No. 31, in a sport or business. No. 32, in the home or in a profession.

Popular Mechanics Magazine offers no prizes for correct answers to these problems, but presents them for the interest it believes its readers will find in attempting to determine the nature of the various articles shown.

If you think you have the right answers you can find out by comparing them with the correct list which will appear in Popular Mechanics Magazine for November.

In September the following articles were shown. No. 1, dentist's drill. No. 2, corncob curry-comb. No. 3, collapsible oven. No. 4, umbrella. No. 5, cigarette case. No. 6, book rest. No. 7, vacuum sweeper. No. 8, hook and eye. No. 9, hot-lid lifter. No. 10, necktie holder. No. 11, fly-swatter. No. 12, insect-proof cup for furniture. No. 13, spool holder to be attached to waist of seamstress. No. 14, milk-bottle carrier. No. 15, safety-pin. No. 16, clothes wringer.

WATER TAKES PLACE OF ICE IN COOLER FOR FOOD

For farmers and others who find it difficult to obtain ice, a cooler is being made

Iceless Cooler Installed in Deep Well to Keep Food Fresh at Little Cost

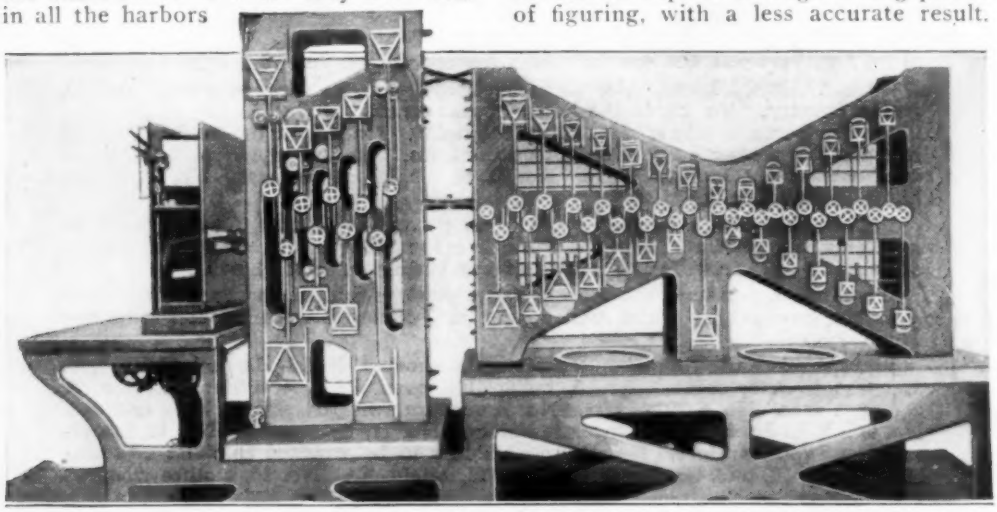
that is suspended by a windlass in a well, or which may be placed in the house or cellar. When used indoors, the container is covered with woven burlap which is kept saturated by water from a pan at its top. Rapid evaporation of the moisture from the cloth draws the heat from the interior and reduces the temperature to a point sufficiently low to prevent food from spoiling. A single filling of the basin usually lasts 24 hours. Light in weight, it may be moved about easily. When hung in a well, the evaporation system is not required. Suspended just above the top of the water, the provision chamber may be easily raised or lowered. A ratchet holds it firmly at any desired point. Built of steel and cylindrical in shape, both types are easily cleaned and sanitary.

BEES KILL LIZARD AND TURN IT INTO A MUMMY

Evidence that bees stung a lizard to death and then embalmed the body was found recently in the South, when small boys pulled the reptile from a hive. Scientists agreed that it had wandered into the home of the bees about a year ago, squeezing under the opening, and was killed. There were signs that the bees had tried to cast out the intruder. When they failed, a thick coating of wax was applied to the body. This mummified it perfectly.

TIDE MACHINE DOES WORK OF SIXTY EXPERTS

Equipped with a machine, recently designed, government officials have been able to predict the heights of tides and the exact hours at which they will occur in all the harbors of the world during the year 1924. In order to prepare such a chart of information, it would require the services of at least 60 experts through a long period of figuring, with a less accurate result.



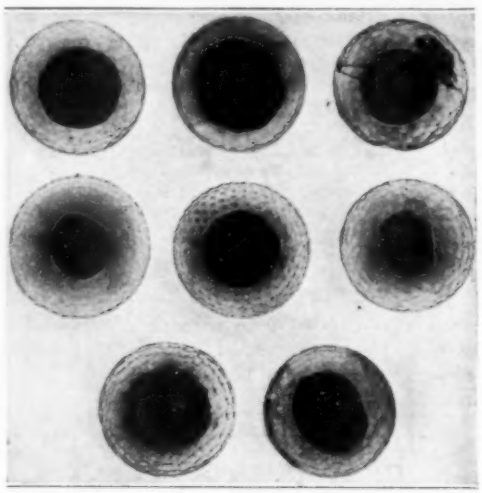
Predicting Time and Heights of Tides in the World's Principal Ports Far in Advance of Their Occurrence, Is the Work of This Remarkable Piece of Machinery

POISON CUPS TO DRIVE AWAY EVIL SPIRITS IN KONGO

When natives of the Kongo find one of their number acting queerly, he is thought to be filled with evil spirits, and a meeting of the tribe council is held, deciding that the demons must be driven from the victim's body. To do this a poisonous root is boiled and the patient asked to drink it. If he refuses, he is charged with being a coward and claimed to be in the possession of devils. The natives placed in this position do not like to have their courage questioned, and swallow the liquid, which frequently results in death. The Belgian government, it is said, has passed a law against the practice, but it is still carried out in secret.

X-RAY SHOWS WHY GOLFERS MISS HOLE IN PUTTING

Why golfers sometimes miss the hole in putting was shown by a western scientist recently when he made X-ray pictures of 20 kinds of golf balls. They showed that in only a few were the hard



X-Ray Views of Golf Balls That Show Imperfect Cores, Which Pull or Slice the Drives

resilient cores of gutta-percha exactly round. As a straight course through the air or along the green depends on a properly balanced ball, it was said that an imperfect core might pull or slice the drives, no matter how skillful the player.

¶Sieves woven of bronze wire and used in the testing of the fineness of cement have 40,000 holes to the square inch.

AIR JACKET AIDS SWIMMERS BY FLOATING THE BODY

To aid in teaching persons to swim, an air jacket that is worn either under or

Inflated Life Preserver That can be Worn Either under or over Suit and will Float Heavy Body

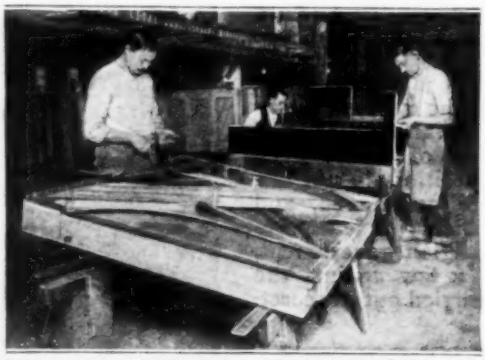
over the clothing has been invented recently. It is strapped about the waist and the chest and when not filled with air lies flat against the body. Sides and bottom of this jacket, made of rubberized fabric, are filled with air blown through valves at the top. The section over the lungs is not inflated. The life preserver, which will roll into a small bundle and weighs only a few ounces, will support a weight of over 200 pounds.

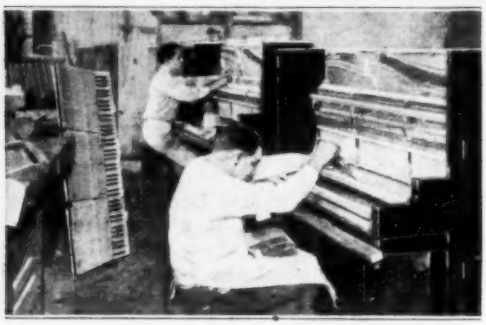
ALLIGATOR BOAT ABLE TO PULL ITSELF UP ON BANKS

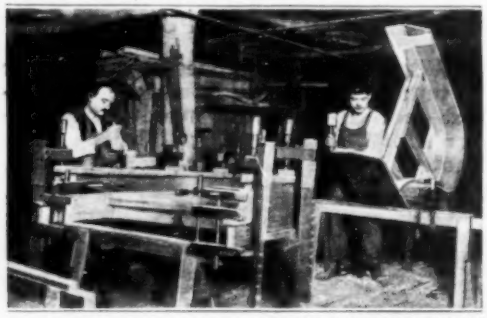
For use in hauling logs on small lakes there has been made in the East a 40-foot boat that moves on land or water. When on land the rudder is raised, the propeller shaft lifted, and the engine moves a rotary drum that works by tackle and fall to pull the boat ahead, the rope being hitched to some firm place. The boilers are set so that they are in an upright position no matter how rough the road. When the vessel reached the loggers, it pulled itself out of the railway car down to the water, sailed across a lake, moved across land, and at last, still under its own power, reached the river, where it is used in hauling logs floated down from a lumber camp. Because of the ability to move on both land and water, it is called an "alligator" boat.

MAKING MUSIC WITH CHISEL, SAW, AND HAMMER

With the application of modern methods that have developed since the 10th century, the piano no longer is the work of a single artisan but is the product of the combined ability of a number of skilled workers. Working with saw, hammer, chisel, and glue they make a musical instrument that rivals and even surpasses any creation of the old masters of the trade, who took weeks and even months to turn out one piano. Each man, an expert in his particular trade, is assigned to a certain part in the building of a piano, such as making the case, stringing the wires, putting in the keyboard and action, or gluing wood parts together. Glue is one of the most necessary products in the making of an instrument as it is used to replace screws in so far as practicable to prevent rattling. Hardly a single screw is used in forming the case, all the many pieces of wood being held together by glue. Formerly the piano was an instrument that could be purchased only by the wealthy.







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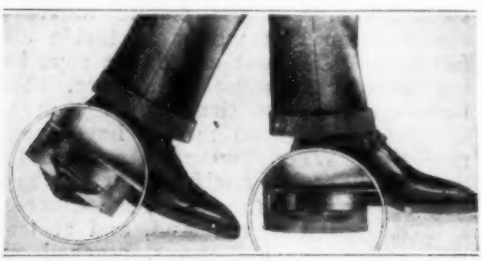
Above, Experts Placing Strings and Putting Finishing Touches on Piano; Left, Workmen Installing the Keyboard and Action; Right, Fashioning and Gluing Together Parts of the Case

SPRINGS IN RUBBER HEELS MAKE WALKING EASIER

Rubber heels have been patented with steel springs tightly locked inside to add to the wearer's comfort by cushioning the jar in walking. They contract at every step and are said to absorb more of the shock than rubber alone. To prevent slipping on wet surfaces, the heel bottom is ribbed.



X-Ray View of Rubber Heels That Have Steel Springs in Them to Help Absorb the Shock

U. S. MONEY TAKES PLACE OF PANAMA CURRENCY

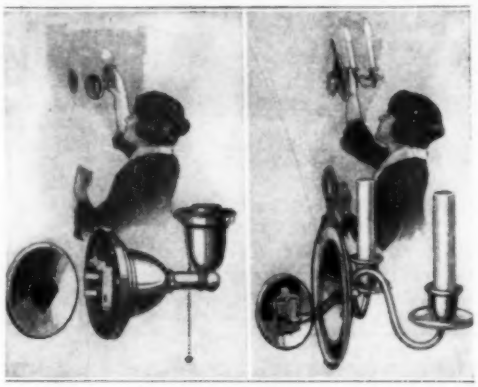
Panama's money, first made in 1904, has passed out of use in that country, and today practically the only kind in circulation is American banknotes and coins. This was brought about, it is claimed, by high prices of silver in 1917, resulting in natives secretly selling their coinage to outside buyers for more than it was worth in their own country. The dollar now acts as the basis for all kinds of business dealings, and is considered to be of great value to the people in general, who have shown a preference for it.

WHITE WOMAN RULES ISLAND OF RICH PEARL DIVERS

Badu, one of the most prosperous islands off Australia, is ruled by a white woman. She is the governor, teacher, preacher, judge, and prohibition officer for dark-skinned pearl divers, who have found rich rewards in disposing of the shells under her management. The women, also under her control, make a lace, fine in texture and beautiful in pattern. When their day's work is done the "governor" meets them on the green, where they practice English folk dances. Liquor is forbidden and the island is reputed to be a model of cleanliness.

WALL BRACKET FOR LIGHTS MOVABLE ABOUT ROOM

Rearrangement or exchange of electric-lighting fixtures is now possible by a movable bracket that is being made with a special wall or ceiling receptacle. Thus any number or styles of lights may be tried out for the desired lighting effect without employing an electrician. By installing several of the receptacles, the location of bulbs may be changed as often as desired to harmonize with regroupings of furniture. When a socket is not in use, any other household electrical appliance may be attached.

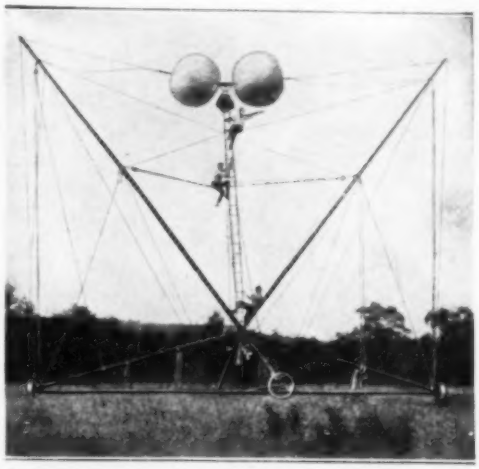


Lighting Fixtures may be Changed When Desired by Use of Movable Bracket

¶ Blotting paper is being made from wood pulp. Heretofore it was made only from rags, as it was believed that sawdust would not prove sufficiently absorbent. A large proportion of the pulp used is from wood that has not been considered of much value.

BALLOONS KILL GYPSY MOTHS WITH SPRAY OF POISON

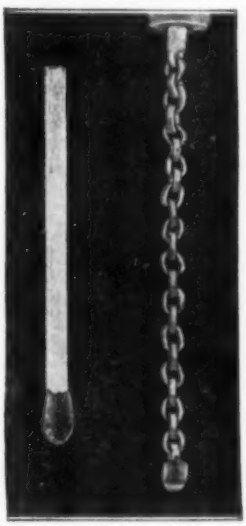
For spraying crops with poison powder to destroy gypsy moths, government experts have hung army balloons on a cable stretched between two tall poles supported on a ground framework that moves on wheels. A large supply of insect chemical is carried near the gas bags which furnish the force to scatter it.



Army Balloons are Suspended from Mooring Frame for Spraying Crops to Kill Destructive Pests

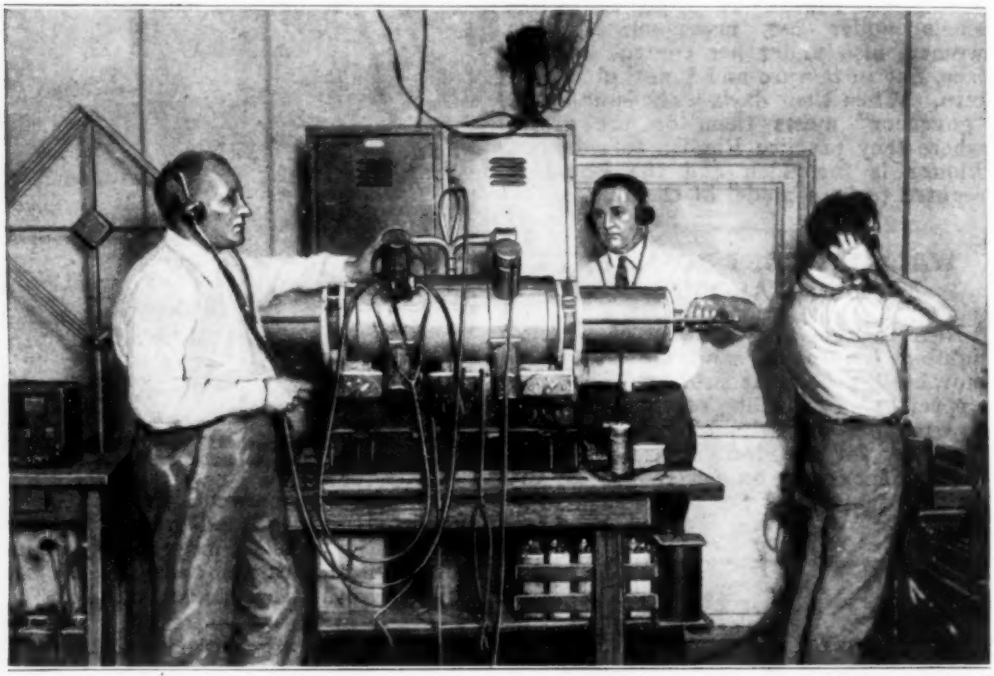
CHAIN CARVED FROM MATCH WITHOUT SINGLE BREAK

With all the links joined together, a wood-carver has fashioned an ordinary match into a small chain. Less than 3 inches in length, it is an exact reproduction of a large cable. As the splinter of wood with its inflammable tip is about an eighth of an inch wide, extreme care was necessary to cut out the tiny units, one carved from within the other. Each circlet is about the size of the link of a fine watch chain. It was made by Henry L. Brown, of Seattle, Wash.



RADIO NOISES STOPPED BEFORE REACHING EARS

Noises that interfere with wireless communication are said to be done away with by a machine being tested by the government. The apparatus has eight tubes that carry the sounds to the interior, where the disturbing noises are filtered out before reaching the receiving device. During the summer months the atmospheric sounds are more numerous than at other times. Equipped with the new instrument, the operator finding it difficult to hear distant stations can put the clarifier in the circuit by means of a switch. The tubes then receive the message, convey it to an eliminator, where it is separated from disturbing sounds. It is believed the instrument will prove suitable for use during communication between airplanes for barring out noises from the engines.



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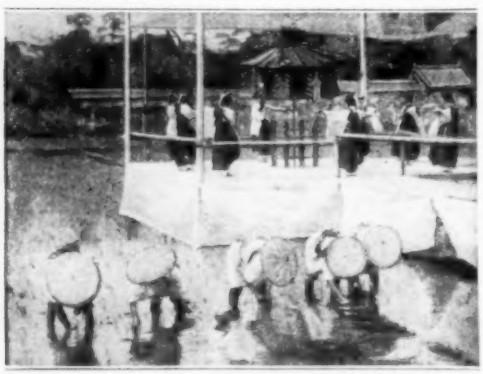
Operators Using the Radio Clarifier, an Instrument Devised to Extract Static Noises and Other Disturbing Sounds from Wireless Messages Before They Pass into the Receiving Apparatus



Japanese Planting Ceremonies Held to Celebrate the Beginning of the Rice-Growing Season

RICE PLANTED TO DANCE MUSIC IN JAPANESE FIELDS

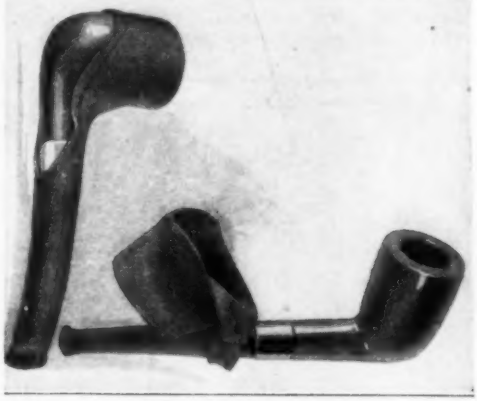
Near Osaka, Japan, each year when the rainy season begins, important ceremonies are held by the native farmers to celebrate the planting time for rice. Shrines close to the field where the event takes place are devoted to a kind of religious festival, marked by gay and solemn performances. In the center of a raised platform, a canopy is held by a girl in costume dress, while nine others go through strange dances. Five girls garbed as rice-field workers wade into the marsh and plant the grain in time to music.

WOMEN INVENTORS ARE BUSY ON INDUSTRIAL PROBLEMS

To learn just what part women were taking in inventions, government officials recently undertook a survey that showed over 5,000 patents had been granted to them in 10 years, more than the total for 105 years previous. The first patent granted an American woman was given by the British government to the wife of a Pennsylvania planter, for a device to clean and cure corn. Labor-saving machines are said to make up the majority of women's inventions, one making an apparatus for scattering fertilizer, another an article to strip sugar cane, while an adjustable horse collar was made by a Montana woman. For the kitchen, a pie pan was brought out that prevented juices from overflowing the rim, and a wooden mixing bowl was invented that would not split. Almost every line of business was included, but 1,385 patents were for articles of housekeeping.

RUBBER COVER FOR PIPE KEEPS POCKET CLEAN

To keep tobacco ashes from spilling into the smoker's pocket, a rubber pipe cover has been made, having an asbestos top for the bowl. It can be put on while the pipe is hot without danger of sparks setting fire to the clothing, and also



Rubber Pipe Cover to Protect Smoker's Pockets from Ashes and Danger of Fire

serves to protect the stem from filling up with small particles of dirt when the pipe is not in use.

¶ Mica is now being obtained from crystalline rocks that once were at least 5,000 feet below the surface of the earth.

BABY CRIB IN WINDOW CAGE FOR FRESH AIR AND LIGHT

In a wire cage attached to a third-story window of an apartment in London a baby crib is placed so that the infant will

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Wire Cage an Apartment Dweller Built for Window So Baby could Have Fresh Air and Light

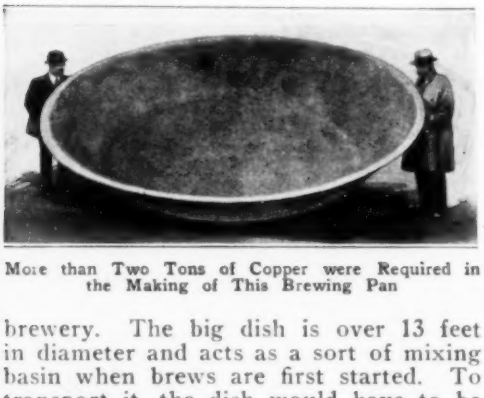
have fresh air and light. Because the building was dark and unhealthy for the child, the father built a compartment of heavy wire netting, placing it on the window sill and bolting it to the brick walls with steel strips. By raising the window the crib is taken from the cage. Cloth or netting protects the baby from dust or insects.

LIGHT RAY TO HOLD WEIGHTS AFLOAT IN THE AIR

To resist the attraction of the earth on heavy bodies, experiments are being made by a western man with a process which, it is claimed, will overcome the laws of gravity and cause the most solid-metal objects to rise without any other aid. This strange force, it is said, will come from a light ray capable of reducing the hardest material to dust thinner than air, and of printing a photograph through a steel plate 5½ inches thick in five seconds. When developed, this power is expected to make wings on airplanes unnecessary, and to do the work of the airship's gas bag by creating an energy that will act against the strongest downward pull, raising and lowering the craft by the amount of current allowed to pass into it, while small propellers will move it.

TWO TONS OF COPPER IN PAN FOR BREWING PLANT

More than two tons of copper were used in making a pan for an English brewery. The big dish is over 13 feet in diameter and acts as a sort of mixing basin when brews are first started. To transport it, the dish would have to be set on edge.



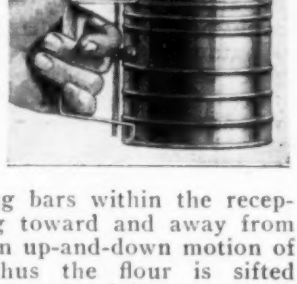
More than Two Tons of Copper were Required in the Making of This Brewing Pan

FLASHLIGHT FOR SCREWDRIVER

With a hollow handle holding a flashlight, a screwdriver is being marketed to eliminate some of the trouble of working in the dark. The bulb throws a bright light upon the end of the tool. As only one hand is needed to operate it, greater freedom of movement is permitted.

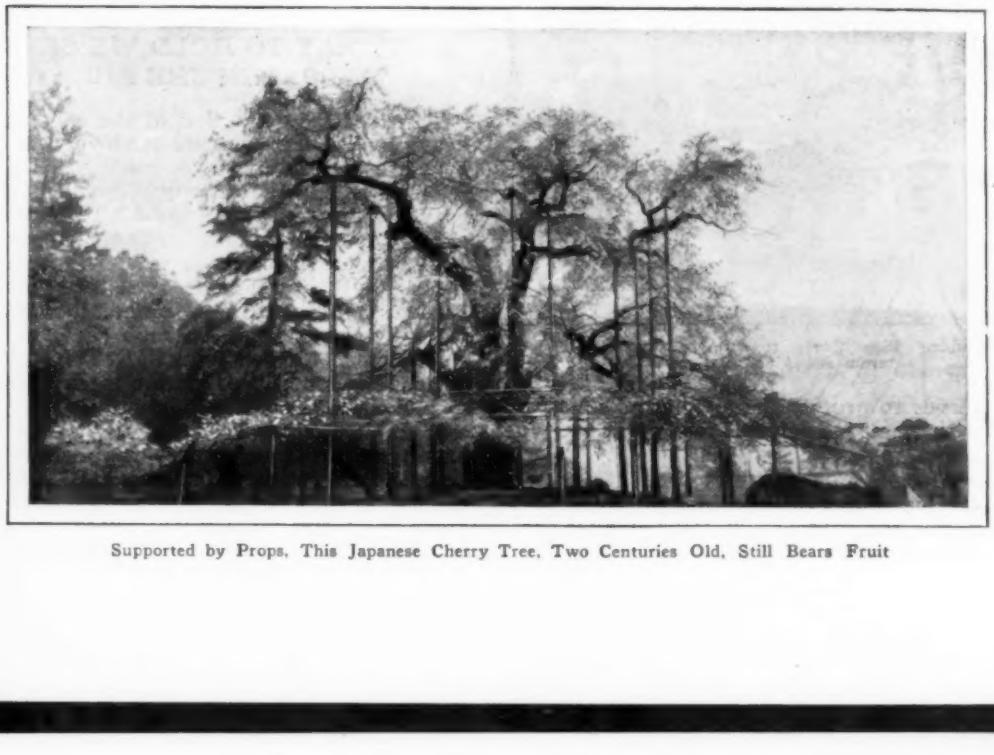
FLOUR SIFTER RUN BY THUMB OVER THE HANDLE

So constructed that it may be operated by one hand, a flour sifter has been invented. Although simply made, it has all the durability and efficiency of the old type and is easier to use. Instead of the usual crank at the side, a spring lever is fixed to the handle of the utensil so that agitating bars within the receptacle are swung toward and away from each other by an up-and-down motion of the thumb. Thus the flour is sifted quickly, leaving one hand free.



ANCIENT CHERRY TREE HELD UP BY PROPS

To support the limbs of a cherry tree two centuries old, growing in a Japanese park, crosspieces at the tops of long pine poles stuck in the ground, are bound to the branches by straw ropes. Lattice-work arbors built close under the lower part of the tree, keep it from drooping. The natives are watchful of their favorite cherry trees, preserving them in various ways as they become aged.



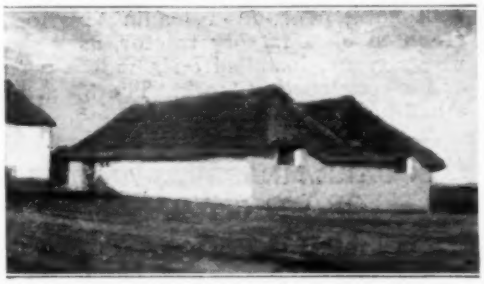
Supported by Props, This Japanese Cherry Tree, Two Centuries Old, Still Bears Fruit

"COLLEGE" TEACHES PARROTS HOW TO TALK

For teaching parrots how to speak English, that is, 10 to 20 commonplace phrases, a resident of a southwestern state has established what is said to be the largest school of its kind in the world. Only birds 6 to 8 weeks old are accepted. Most of them come from the wilds of Mexico. Standing in front of a row of cages, an instructor repeats the few words that constitute a lesson. Those in the class that show more aptitude than others are quickly promoted. Thousands graduate each year from the "college." Even while the birds are awaiting shipment to new owners, they are occasionally made to go over their little speeches so that they won't forget how to talk.

ANT HILLS MADE INTO HOUSES POPULAR IN AFRICA

From material used by ants to make their hills, the natives of South Africa mix a plaster which is said to be stronger than burned brick, to build their houses. Sometimes a single mound thrown up by the insects will furnish enough for several good-sized buildings. The substance when hardened is so tough that only an experienced person can succeed in driving a nail through it.



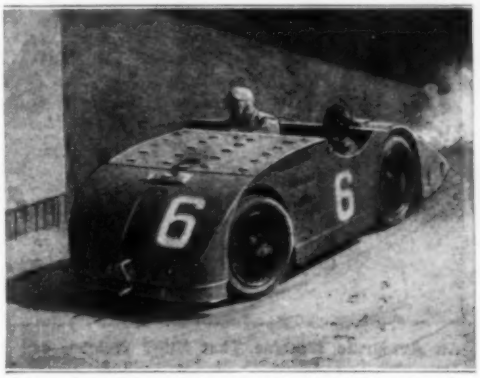
Material Found in Ant Hills Furnished Plaster to Build This South African Home

RAIN HEAVIER IN AFTERNOONS

Along the Gulf coast and in southeastern states, records have been made showing rainfall to be more frequent in afternoons than in mornings. This reason is given for cool nights which are said to prevail throughout those sections of the country, the sun being hottest from noon until nightfall, having its heat offset by moist atmosphere created by such downpours.

TANKLIKE AUTO WINS RACE IN A FOREIGN MEET

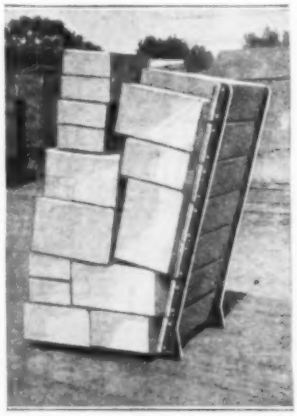
First place among the French entries in a recent meet in Europe was won by a racing auto that looks like a tank. The low metal body, almost reaching the track at front, back, and sides, covered all of the car excepting the wheels. A shell-like specially built front was over the radiator. Low hung, the center of gravity close to the ground gave the car an advantage in making quick turns.



Low Metal Body on Foreign Racing Car That Makes It Look Somewhat Like a Tank on Wheels

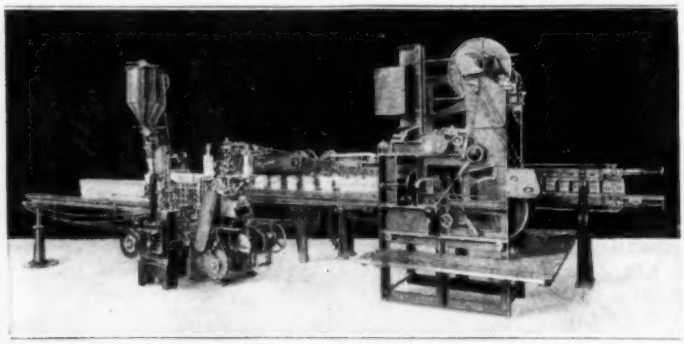
CARRIER FOR FREIGHT TRUCK SAVES SPACE AND MONEY

With a carrier for a two-wheeled freight truck, the amount of handling of separate pieces is cut down, three men can do the work of four, and damage, loss claims, and other expenses are thus lessened. A type made of wood and steel has recently been invented and is in use on an eastern railiway. While being loaded it stands upright. A truck is slipped beneath, and is moved to the desired spot where it is left, still loaded. Thirty to 70 per cent of handling of package freight now necessary is eliminated by use of the carrier, it is said.



OUTPUT OF CARTON PACKER 18,000 PER DAY

Packaging and weighing of flour, cereals, chocolate, coffee, sugar, and many similar products, are greatly simplified by an automatic machine now on the market. This machine feeds the cartons, seals the bottoms, lines the insides, fills and weighs the cartons, and seals the tops, the flat cartons entering at one end, and emerging, ready for the market, at the other. The output is from 15,000 to 18,000 packages per day, depending upon the material handled, and the type of carton employed. One machine of this type can do the work of about 35 hand operators, in a completely sanitary manner, and with a saving in material, owing to prevention of waste.



An Automatic Machine That Fills, Weighs, and Seals Cereal and Other Packages at the Rate of 18,000 per Day

PORTABLE DERRICK HAS WIDE RANGE OF USES

Wherever loads are to be hoisted, whether a few feet or several hundred, a one-man portable derrick lately marketed will prove of value.

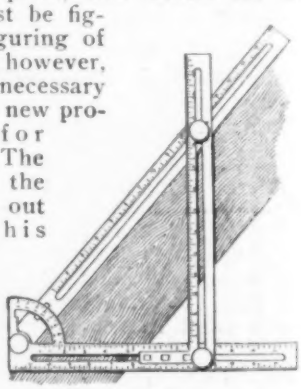
One-Man Portable Derrick Unloading Heavy Beams from Gondola

The derrick is made in two major parts, the beam, including the hoisting mechanism, and the base, each of which can easily be carried by one man. The hoisting mechanism enables one man, with a three-strand cable, to lift a load of 1,000 pounds easily, and two men to hoist 2,000 pounds.

Two types are manufactured: one for general use, and one for attachment to a gondola car. The general derrick has a very wide range of uses, as permanent equipment on a loading platform, mounted on a factory tractor, as a shop utility crane, installed on a motor truck, or for construction work. The block has a ball-bearing swivel shackle.

SQUARE MEASURES ANGLES FOR WOODWORKERS

It is a rather tedious process to get the proper length, pitch, and bevels for a rafter if it must be figured out; figuring of this character, however, is rendered unnecessary by the use of a new protractor square for woodworkers. The square enables the worker to lay out problems of this kind accurately and quickly, and, after the tool has been set, the length, pitch, etc., can be read off at once, and the tool used to mark off the bevels. It will be found

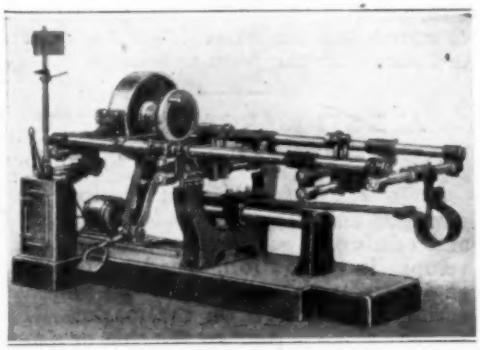


exceedingly useful to anyone whose work requires the laying out of rafters of every description, stairway stringers, tank work, columns, silos—in fact, all work where calculations for length, pitch, or bevels are necessary.

MACHINE MEASURES UNBALANCE OF ROTATING PARTS

Static and dynamic balance of the rotative parts of high-speed machinery may be obtained at the same time by means of a recently developed machine.

The machine measures how much, and just where, a part is out of balance, and will accommodate a wide variety of work, including crankshafts, motor and generator rotors, flywheels and spindles, and it is stated that the operation of determining the unbalance is as simple as using a pair of scales. The process of balancing parts is a rapid, exact, and economical one, owing to the simplicity



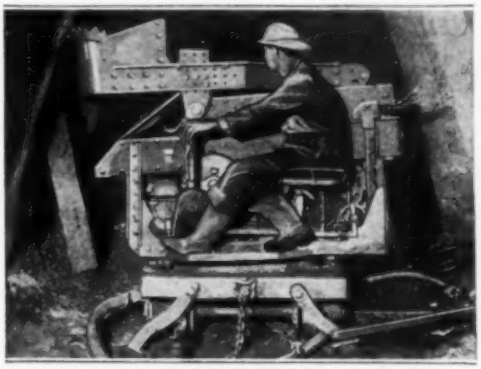
Machine That Determines Accurately How Much and Where Parts of High-Speed Machinery are Unbalanced

of operation, and the elimination of a preliminary static-balancing operation on separate shears. The machine will receive parts up to 25-in. swing, and 48 in. long, weighing up to 1,000 pounds.

UNDERGROUND SHOVEL CUTS MINING COSTS

Hand shoveling constitutes one of the greatest cost factors in underground mining; not only is it hard to obtain efficient help, but, in the crowded "breast" of a vein, there is often not room enough for more than three or four men to work, and, after a blast, it is some time before the men can return to work, thus adding the idle time of many men to the cost of production.

For these reasons, and for many others, an efficient underground loader now on the market will prove valuable. The machine is air-driven, and is made in three sizes; the smallest can pass through a space 42 by 48 in. in size, with seat and

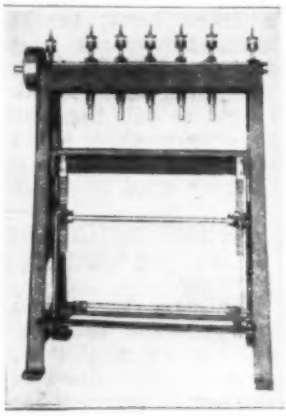


View of Underground Shovel Swinging in Drift, Showing Small Clearance Required

bucket arm removed, and can be pushed anywhere by one man. It is claimed that one of the machines, in driving a rock drift, 15 ft. wide and 9 ft. high, saved $1,700 in 25 days, over the cost of hand shoveling.

STRAIGHT-LINE GANG DRILL SPEEDS UP PRODUCTION

Designed to meet the requirements of work where the holes are all in one straight line, and at varying distances apart, a gang drill now on the market should meet with instant favor.



Each head is in a gear case by itself, and the heads can be set any distance apart from 1¾ in. to any required distance within the range of the tool. The setting operation is very simple, as it is only necessary to loosen a few screws and slide the heads to the required positions. The machine may be furnished with a foot, hand, or automatic table feed, depending upon the work for which it is to be used, and the speed may be adjusted to suit either wood or metal.

SIFTING MACHINE EFFECTS RIDDLING ECONOMY

While designed especially for foundry work, a sifting machine now on the market will prove of great value wherever

Riddling Sand in the Foundry with the Sifting Machine

sand or other granular material must be riddled in quantity. The machine is self-contained, and may be suspended from a crane hook, bracket, beam, or any other convenient place. There are no legs or tripods underneath to impede the operation, and it can be hung at any height to suit the workers. In ordinary foundry work, it will riddle 1 ton of oil-core sand in 3½ minutes, or 1 ton of foundry sand in 4 minutes.

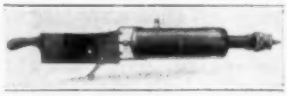
SUBMERSIBLE DYNAMO USED IN WATER METER

Ordinary water-flow meters, using a cup-and-vane mechanism, indicate only average rates of flow, as marked by a counter that operates after a certain number of revolutions; an electric water-flow meter, recently invented in Switzerland, on the contrary, registers the rate of flow at any moment. The instrument is like a small torpedo, about 20 in. long, and is suspended in the water by means of an encircling strap. The nose of the torpedo carries a two-bladed propeller and shaft, which drives a simple dynamo contained in the body. The current generated is recorded or indicated by a galvanometer, which is calibrated to show the rate of current flow.

The meter is said to be equally satisfactory in open water and in pipe systems, and for recording the flow of gases. It is very little influenced by temperature changes, and responds to flow in either direction.

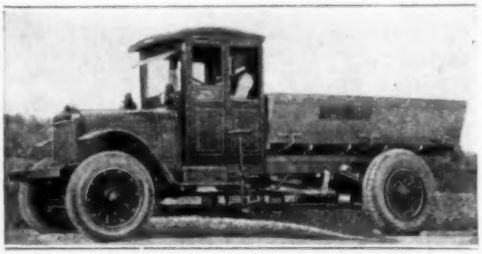
BOILER-TUBE TOOL CLEANS TEN A MINUTE

Ten tubes cleaned a minute is the record claimed by the inventor of a recently patented boiler-tube cleaner. The "gun" is mounted on trestles in front of the boiler, and an air hose, with a nozzle on the outer end to fit the tubes, is attached to it. One man operates the gun, another the hose. The gun may be operated and the tubes cleaned as fast as the man with the hose can move.



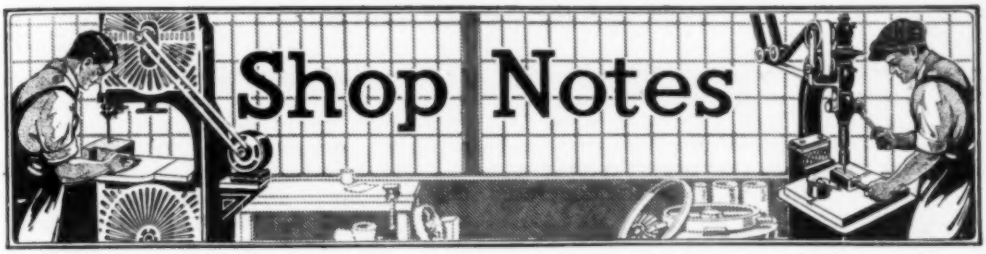
ALL-STEEL ROAD SCRAPER HAS LONG LIFE

Built of materials that insure great strength and long life under hard wear, and reinforced wherever extra strain develops in operation, road-maintenance engineers will appreciate an all-steel spring scraper now on the market. The float or plane will go to the side or shoulder of the road, gather the loose gravel



Road Scraper of All-Steel Construction Attached to Truck

and move it to the center of the road in one operation. The scraper can be mounted on a truck, and can be raised and the truck backed up to perfect a bad piece of road without having to turn. In winter, the scraper can be used as a snow plane, and will handle 6 to 8 in. of snow at a speed of 15 to 25 miles per hour.



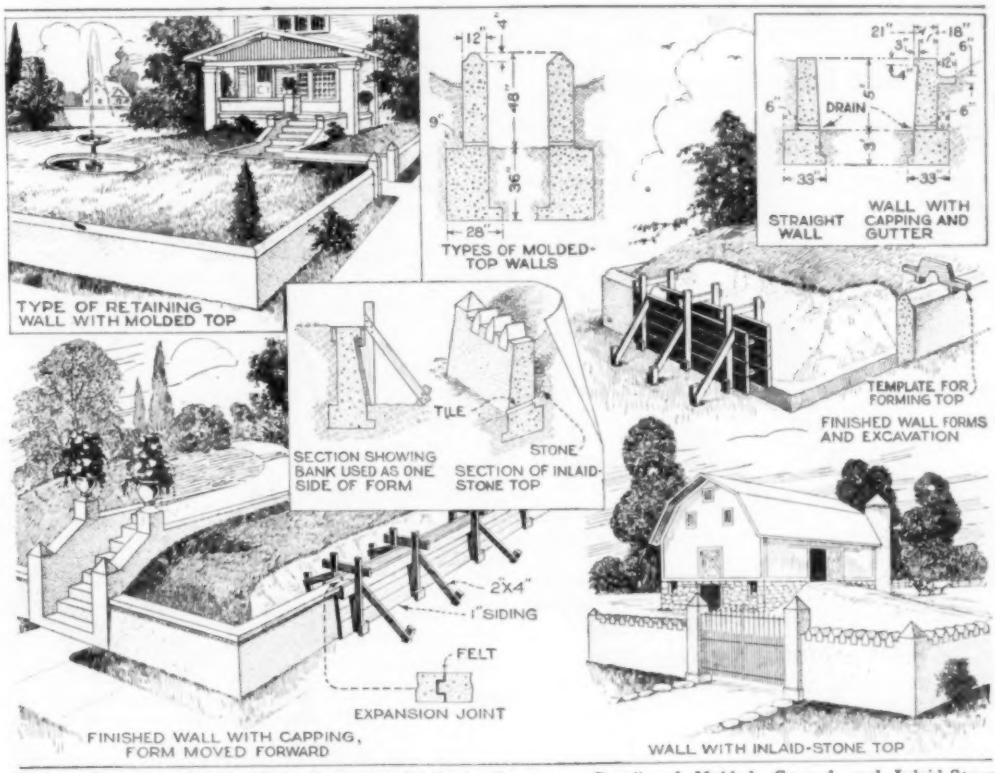
All Shop Notes published in 1922, in book form—Fifty Cents—from our Book Department.

Building Concrete Retaining Walls

BY A. C. COLE

THERE is nothing at all difficult about the building of retaining walls in concrete, the cost of the work is low, and the finished wall adds greatly to the appearance of the inclosed grounds.

The excavation for the wall footings must be carried below the frost line, and, where the earth is firm enough, the bank itself may be used as one side of the form, undercuts being made in the bank to form the projecting lower portions of the footings. Where the earth is not self-supporting, it is, of course, necessary to cut away the bank so that forms can be used on both sides and the wide footings poured. This, however, is not a disadvantage, as it allows a layer of loose stones, gravel, or cinders to be laid along the back of the wall before filling back the earth, and this helps the drainage.



Various Forms of Easily Made Retaining Walls in Concrete: Details of Molded, Capped, and Inlaid-Stone Tops are Given in the Inserts

As may be noted in the drawings, the forms are very simple; 1-in. siding is used for the sides, with 2 by 3 or 2 by 4-in. uprights and braces. Enough uprights, braces, and struts must be used to prevent the forms from bulging, and

the walls held the proper distance apart by short pieces of the material used for the uprights. The walls are held by twisted-wire ties in the usual manner, and by cross braces at the top; the spacing pieces are moved upward as the concrete is placed.

As soon as the footings have been placed, and the forms erected, a number of concrete drain tiles are placed in the forms, as indicated in the sectional drawings, to carry off water, and the remainder of the concrete is then placed. The concrete used should be mixed in the proportion of 1 part cement, 2 parts sand, and 4 of clean, broken stone, and, when pouring the concrete, a flat, sharpened stick or a spade should be used to cut down between the form and the mixture, to work the stone back from the face of the wall, rendering the surface dense and smooth.

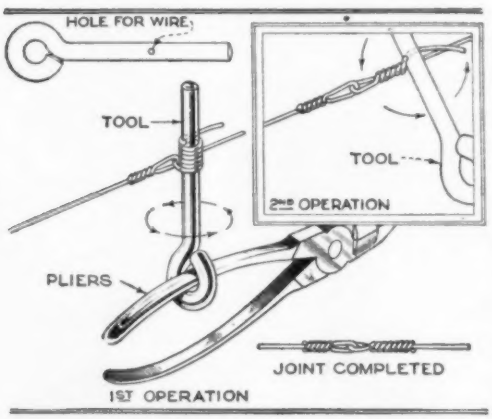
If the wall is at all long, the work should be done in 20-ft. sections, moving the forms along as soon as the concrete in one section has set, and expansion joints, of the type shown, filled with asphaltic felt, provided between sections.

Various forms of coping are shown in the drawing. The molded top presents a very neat appearance, and is easily formed by means of a wooden template, drawn along the top of the wall while the concrete is still "green." With a little more trouble, a neat gutter may be formed on the back of the wall, the trough being shaped with a trowel. A particularly attractive top is formed by inlaying stone blocks, as shown in the lower right-hand view, although this is rather more expensive.

The forms can be removed as soon as the concrete has set enough to sustain its own weight, and the surfaces may be finished by simply rubbing with a wooden float dipped in water and sand; in this way the form marks are rubbed off, and a smooth, permanent surface obtained.

Novel Fence-Wire Stretcher

The fence-wire stretcher shown in the illustration consists of a short length of

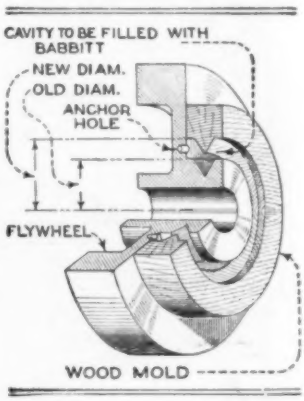


Lower Illustration Shows Method of Tightening Wire, and Insert, Method of Fastening Free End

½-in. iron rod with a hole drilled through it as indicated, and the end formed to a ring large enough to accommodate the handle of a pair of pliers. When the wire is to be tightened, it is not cut near a post, but midway between two posts. One end of the cut wire is formed into a loop, and the other end passed through the loop and through the hole in the tool. The tool is turned by means of the plier handle, as indicated, so that the wire is wound around it until sufficiently tight. The tool is then revolved around the wire several times, as shown in the upper detail, and the surplus wire clipped off.

Increasing Diameter of Small V-Pulleys

When it is desired to increase the diameter of a V-pulley, such as often found on the side of a small flywheel, a "rim" of babbitt can be cast around it, providing the increase in size is not too great.



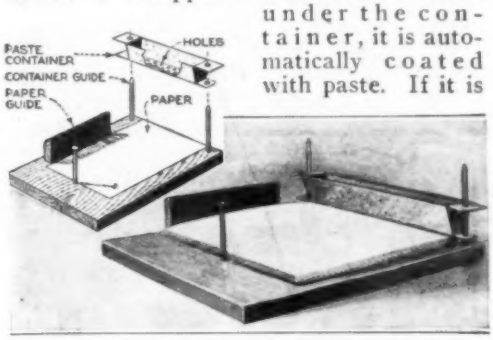
Small anchor holes are first drilled in the side of the wheel, as shown. A wooden mold is then turned out of good dry pine to the new diameter. The mold is placed around the pulley, concentric with the bore, and clamped in place, after which babbitt is poured into the open space between the mold and the old pulley. If it is desired to use the old pulley again, it is only necessary to cut off or melt the babbitt. When melting the babbitt, whittle a clean surface on the end of a pine stick and dip it repeatedly in the metal. When the stick chars, pour the babbitt.

An Efficient Paste Spreader

In offices where many papers are wrapped by hand for mailing, the paste spreader illustrated will be very useful. It eliminates the paste brush, and speeds up the work considerably.

The base is made from an ordinary 1-in. board. An upright piece of the same material is screwed to one side of the base to keep the edges of the pile of wrappers even. Heavy spikes will serve for the paste container guides, although ¼-in. iron rods are better. The container is a triangular trough with a flat bottom, in which a number of small holes are drilled to distribute the paste along the wrapper edges. Ears are left at each end of the container, and holes drilled to fit the guides, so that the container can move up and down easily. Medium-weight galvanized sheet metal is a suitable material for the container.

To use the spreader, the papers are first placed in a pile under the paste container, which is then filled with paste, mucilage, or glue, whichever is necessary. When a wrapper is drawn out from under the container, it is automatically coated with paste. If it is found that too much paste is applied to the wrappers, the container may be weighted down so that less paste will escape through the holes.—Lowell R. Butcher, Des Moines, Ia.

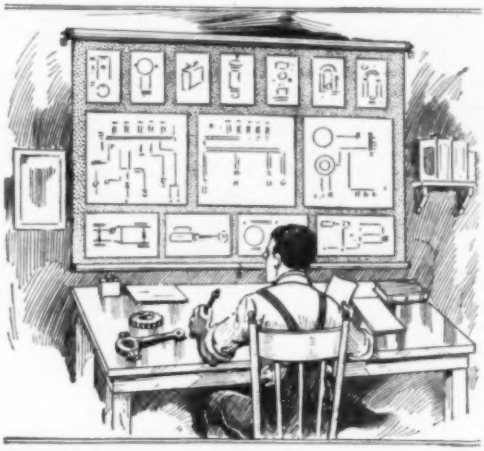


Device for Applying Paste to the Ends of Wrappers, That Speeds Up the Wrapping Process Considerably

Novel Mounting for Instruction Manual

In garages and service stations where drawings and wiring diagrams are required for reference while working on cars, it is almost impossible to keep them from being soiled, as they are continually being handled with greasy hands.

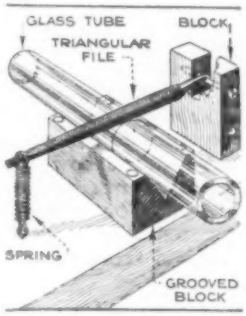
To prevent this, in one station, the sheets were glued to the inside of an ordinary roller shade, which was mounted on the wall in front of the foreman's desk. Whenever the reference prints were to be used, the shade was simply unrolled, and when the job was finished, rolled up again. Besides keeping the prints clean, this prevented them from being creased, torn, or lost.



Novel Method of Mounting Reference Prints on the Inside of an Ordinary Roller Shade

Cutting Glass Tubing

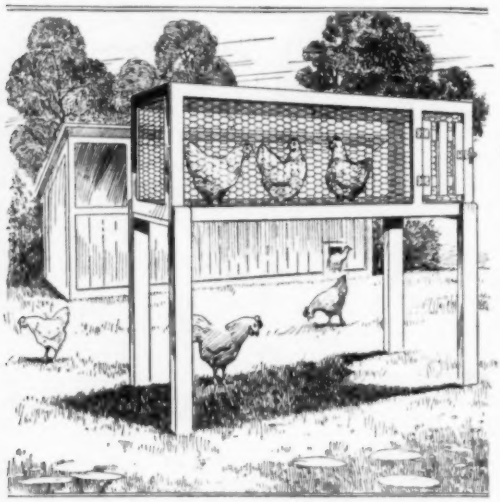
The illustration shows an excellent method of cutting glass tubing. A block of wood with a V-groove cut in it is attached to the bench; a triangular file is arranged across this, the tang of the file having an eye formed in it, which swings on a pin driven through another block attached to the bench, as shown. The other end of the file is slipped through the end of a coil spring which is fastened to a screw eye driven into the bench, and draws the file downward against the tubing. The tubing is placed in the V-block, between the block and the file. Turning the tube will then cause the file to score the glass, after which a few light taps will break it cleanly.



¶ Information as to where materials and parts mentioned in these pages may be obtained will be furnished, on request, by the Bureau of Information.

Curing a Broody Hen

There are hundreds of ways advocated for curing broody hens, but most of these are not entirely effective. Simply confining the hen in a coop without nests



An Elevated Coop with Wire-Mesh Bottom Effects a Cure for Broody Hens in Five or Six Days

will not cure her, unless she is kept there until completely exhausted. A positive cure, which requires only 5 or 6 days, is shown in the drawing. An ordinary elevated coop will not do the work, as the idea is to prevent warmth under the hen when she sits down, and therefore the floor should not be made of wood, but of 1-in. wire mesh. The air from underneath soon effects a cure; it has done so with the most persistent hatchers.

The coop should be elevated about 3 ft. above the ground, and it should be large enough to accommodate 6 or 8 hens. Pans or narrow troughs, on which the fowls cannot sit, are used for food and water. The top of the coop should be covered to protect the hens from the hot sun and from showers.

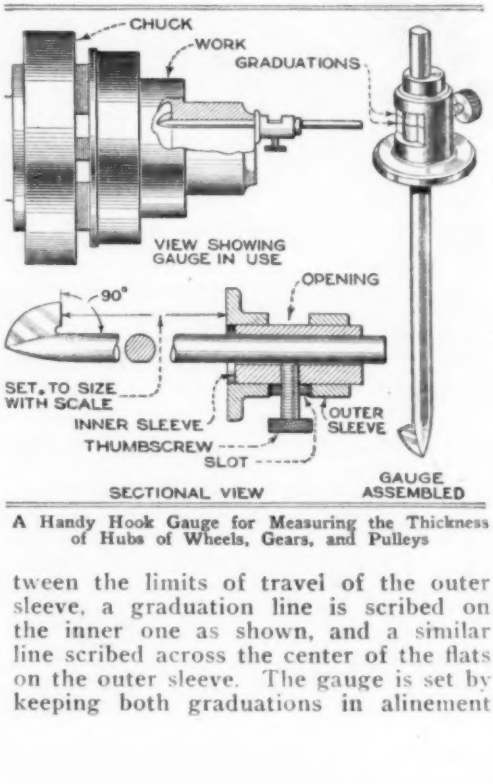
Machinists' Hook Gauge

Nothing is so hard to measure in the machining of work on the lathe as the thickness of hubs of wheels, gears, and pulleys. This is due to the fact that many holes are too small to allow the use of a regular hook rule, and even if one could be used, it is often too short to reach through the bore. A very serviceable hook gauge that eliminates these difficulties can be made as shown in the illustration.

The main part of the gauge consists of a suitable length of ¼-in. drill rod provided with a hook at one end. The hook is made by forging a sharp bend in the rod, and filing it to the shape shown. The straight edge of the hook is filed perfectly square with the axis of the rod, and the corner is filed out with a small round file, to prevent the accumulation of dirt, which would result in incorrect measurements. The notching out of the corner also prevents a burr on the edge of the bore from showing a false reading on the gauge.

The head of the gauge consists of two parts; an inner sleeve, bored out of center as shown, which is necessary to allow sufficient metal for the thumbscrew, and an outer sleeve, bored to a neat sliding fit over the inner one, and having a flange at one end, which is turned perfectly square with the rod. The outer sleeve moves over the inner within the limits of the thumbscrew slot. This always holds the outer sleeve square to the graduation line on the inner sleeve, and as a flat is filed on the rod, against which the screw bears, the whole gauge is kept in line.

Across the face of the outer sleeve is filed an opening, as shown, to expose the surface of the inner sleeve. Midway be-



A Handy Hook Gauge for Measuring the Thickness of Hubs of Wheels, Gears, and Pulleys

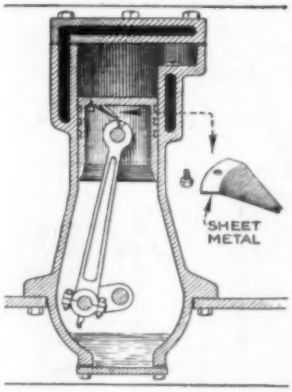
tween the limits of travel of the outer sleeve, a graduation line is scribed on the inner one as shown, and a similar line scribed across the center of the flats on the outer sleeve. The gauge is set by keeping both graduations in alinement

while measuring between hook and outer sleeve with the scale. When set to size, the thumbscrew is tightened, and, upon applying the gauge to the work, holding the hook against the inner face of the hub and sliding the outer sleeve against the outer face, the amount to be turned off is indicated by the distance between the graduations. This gauge not only indicates when the thickness of the hub is correct, but how much it may be over or under size.

A gauge of this kind, when used for general purposes, should be made of ¼-in. rod; smaller or larger sizes can be used to suit the work. With the gauge of ¼-in. steel, holes can be measured through ½-in. bores.

Lubricating Wristpins

During winter the tractor requires considerable care, as the heavy oil that is used in tractors becomes almost a grease in zero weather, and in this condition does not lubricate the wristpin bearings properly, so that there is danger of burning out the bearings or "freezing" them.

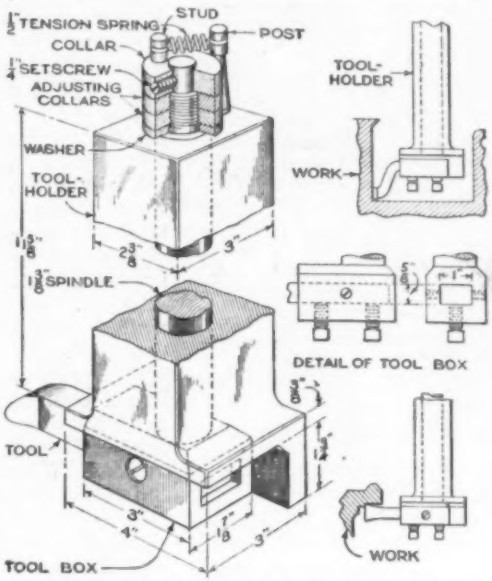


To offset this danger, I provided the auxiliary oiling device illustrated, which consists of a piece of No. 20 sheet steel, hammered to the shape shown in the detail and screwed to the underside of the piston head, so that the spout terminates directly over the oil hole in the top of the wristpin bearing. The point where the device is bolted must be opposite the point where the splash from the crank reaches the inside of the piston, so that the spout will catch some of the oil. This oil will then drop on the bearing where it is needed. The addition of this device has been found to eliminate much trouble previously experienced.—G. G. McVicker, North Bend, Neb.

¶A tap should never be used to clean a hole in hardened work, even if the work is soft enough to be scratched with a file.

Holder for Side-Planing Tool

The illustration shows a useful side-cutting planer-tool holder, which does work that at times cannot be done with



An Improved Holder for Side Planing That can be Used on Right or Left-Hand Work

the regular planer heads. It can be used on either right or left-hand work.

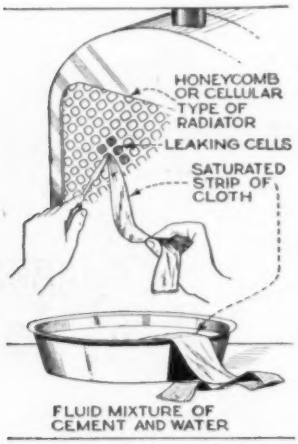
The tool box is machined on the lower end of the spindle, and fits against the shoulder at the rear of the body. The upper end of the spindle is threaded and fitted with a washer and two adjusting collars; over the latter is placed a collar, which is fastened to the spindle with a setscrew. A stud in the top of the collar, and a post in the body of the holder, are connected by a tension spring, which pulls the tool box back against the shoulder at the end of the return stroke. Cutters, forged with an offset large enough to allow the lowest edge of the tool to project below the heads of the setscrews in the tool box, allow cutting to the bottom of slots, as in the drawing.—R. W. Laing, Fergus, Can.

Absorbing Excess Oil on Dirt Streets

When a dirt street is oiled, the oil is usually tracked all over where it is not wanted. This was prevented, in an Iowa town, by spreading powdered stone—refuse from a stone crusher—over the road. The stone dust absorbed the excess oil, and it packed down at once.

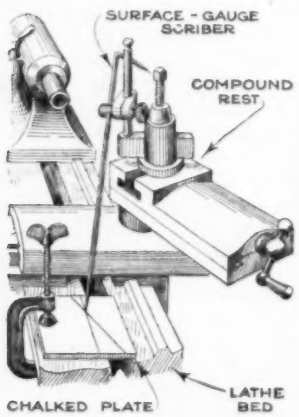
Cement and Cloth Repair for Radiator

The soldering of a honeycomb radiator is difficult work and can be accomplished satisfactorily by an experienced repairman only. However, a repair for small leaks, that can readily be made by anyone, is shown in the illustration. It consists of packing strips of cloth, saturated with a thin mixture of Portland cement and water, into the small spaces where the leaks are found. The cement hardens and binds the cloth into a solid mass. It is not necessary to remove the radiator when making this repair, but the water should be drained out so that the cement particles in the cloth will not be washed away, and the cement should be permitted to set before refilling the radiator.



Setting Compound Rest for Tapers

For certain kinds of taper work, when the compound slide is used, swiveled around, and fed by hand or power, the taper is best found by the trial scribing of a surface plate and clamping the slide in position when the scribed angle is found to be correct. A small surface plate, or any smooth metal plate, is clamped to the lathe bed, while a surface-gauge scriber is attached to a holder clamped in the tool block, the plate being either chalked or blued, according to the accuracy required. Then the lathe carriage is run along by hand, far enough to allow the surface-gauge pointer to scribe a line along the plate; this line, of course, being parallel to the lathe bed.

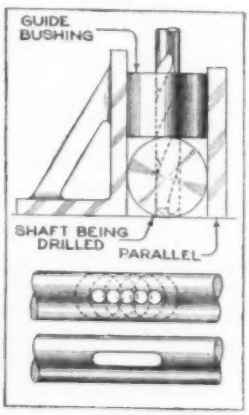


It is assumed that a template showing the correct taper is at hand, and that the exact reading of the taper angle, in degrees, is unknown, as is often the case. If the angle is known and the compound rest graduated, it can be set off at once without the necessity of the scribing process described. Using the template, another line is scribed on the surface plate to make the required angle to the line already made; then, the compound rest is swung around to approximately the right position, clamped, and the compound slide traversed. The surface-gauge pointer, being still in place, will indicate how closely the rest has been set, and the rest is swung and reset until the scriber follows accurately the line scribed from the template.

Drilling Holes through Round Stock

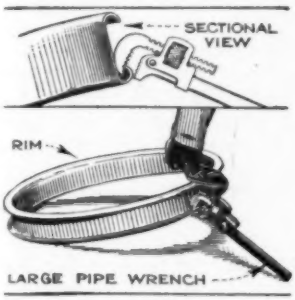
Every mechanic has more or less difficulty in drilling holes centrally in shafting and other round stock, the degree of trouble encountered depending upon the skill of the person doing the work. Even with an accurate layout and great care, the holes are frequently drilled off center.

The method illustrated makes it possible to bore one hole or a succession of holes in cylindrical work with the certainty that all of them will be at right angles to the axis of the work. Also, no layout is required unless a hole has to be a certain distance from the end of the work, in which case a scale can be used, or, where accuracy is required, a depth micrometer, by merely subtracting half the diameter of the bushing from the required dimension. The bushing is turned to exactly the same diameter as the work it is to be used with, and the central hole should be the same size as the one to be drilled in the work. The bushing and the job are then clamped in a vise, or, in cases where the work is too large, between parallels.



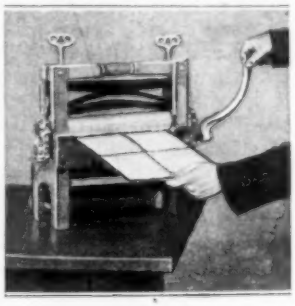
Straightening Damaged Clincher Rims

Clincher rims sometimes become dented and must be straightened to prevent injury to the tires. The rims can be straightened by means of a large pipe wrench. The rim or wheel is removed and placed on the floor and the pipe wrench applied to the dented spot so that the head of the wrench bears against the center of the rim, and the upper jaw presses outward against the dented portion as shown. The end of the wrench handle and the side of the rim farthest away from the wrench will then rest on the floor. By standing on the rim as indicated in the drawing the dent can readily be removed.—E. T. Gunderson, Jr., Humboldt, Iowa.



Ferrotyping Made Easy

Many commercial photographers ferrotype a great number of their prints to give them a glossy finish. This is usually done by laying the prints face downward upon the ferrotype plate and applying pressure with a hand roller, which is hard work and requires time and patience. A better method of doing this is shown in the photograph. An ordinary hand wringer, adjusted to give a slight pressure between the rollers, is used to do the work, the prints being laid face downward on the ferrotype plate and both run through the wringer. Buckling can be prevented by keeping the prints at least ⅛ in. from the edge of the plate.—J. G. Pratt, Washington, D. C.



¶When storing cement, never pile it directly on the ground, which always contains some moisture.

Simple and Useful Clamp for Stepladder

A simple and useful clamp for the stepladder, that serves as a rest for holding windows while setting the panes or painting, can be made from two pieces of oak about 2½ ft. long, with a bolt passing through the center of both as shown; a wingnut is provided on the bolt. It is not necessary to remove the wingnut to attach the clamp. Merely push the clamp over one leg of the stepladder from the inside, and then over the other leg, after which the wingnut is tightened. This tool can be used equally well on a common ladder.—Edgar Wright, Brookfield, Mass.

Handy Clamp on Stepladder for Holding Windows While Working on Them

Filling the Auto Vacuum Tank

If a funnel and small gasoline can are at hand, the simplest way to fill the automobile vacuum tank is to remove the plug at the top of the tank and pour in the gasoline. If no funnel is available, the best method of filling the tank quickly is as follows: Close the throttle and shut off the ignition, then press the starter switch. It may be necessary, with some starters, to switch on the ignition for a moment, in order that the starter gears may mesh. The action of the motor will then cause enough suction to draw the gasoline from the rear tank into the vacuum tank. The throttle must be kept closed, as otherwise the engine simply draws most of the air through the carburetor, and not enough through the vacuum tank.

Building a Floor Crane

By J. V. ROMIG

ONE of the handiest pieces of equipment for the small machine shop, garage, or service station is a portable floor crane, which can be rolled to any part of the shop to take the heavy lifts, and, when not in use, can be shoved out of the way.

A strong and serviceable floor crane can be made in any small shop or garage, at small cost for labor and material, and it will prove a paying investment. With this crane, heavy work may be raised from the floor to the bench or the tables of the various machines, shafts can quickly and easily be placed between the centers of the lathe, and, in the garage, engines can be lifted out of chassis, and run over to the repair bench or stand; in fact, the uses that can be found for the crane are "too numerous to mention."

The lower frame or base of the crane is made from two pieces of 5-in. channel iron, upon which are mounted two columns made of pipe. On top of the columns is the hoist arm, also of channel iron, and fitted with pulleys over which runs the hoisting chain or cable. A drum and a set of winch gears, with their shafts and bearings, are bolted to the columns.

The base members are cut to a length of 62 in., laid out, and bent to the shape shown in the detail drawing; the bends are made at an angle of 45°, with the webs of the channels on the outside. The frame members are spaced apart by a piece of ⅜-in. boiler plate on the underside, and by the 4-in. pipe flanges used for the columns on top. The standard diameter of 4-in. extra-heavy pipe flanges is 10 in., so this will be the width of the length of boiler plate; the plate is cut long enough to project beyond the channels, to form a bearing for the back-caster pivot. Ball-bearing caster wheels are fitted to the three ends of the base as indicated, the caster at the back being provided with a forked handle or tongue, to enable the crane to be pulled about easily. The width of the front end of the base is 48 in., which enables it to be pushed between the wheels of an automobile of the standard 56-in. tread.

The columns are made of 4-in. extra-heavy pipe, and are fitted with flanges at both ends as shown. Both pipes should be cut and threaded so that, when the flanges are screwed home, the over-all length of the columns will be the same; they are bolted to the lower frame and hoist arm with ½-in. bolts, and must be perfectly square and parallel.

The arm or boom of the crane is also made of 5-in. channel irons, 48 in. long. They are spaced apart by pieces of pipe, faced on the ends perfectly square and to the same length, and held with ½-in. or ⅝-in. bolts. Two cable pulleys are placed within the arm at the points shown, before the arm is assembled. The pulleys run freely on plain ¾-in. pins, held in place by heavy cotter pins, and they should be provided with oil cups, and be kept properly lubricated.

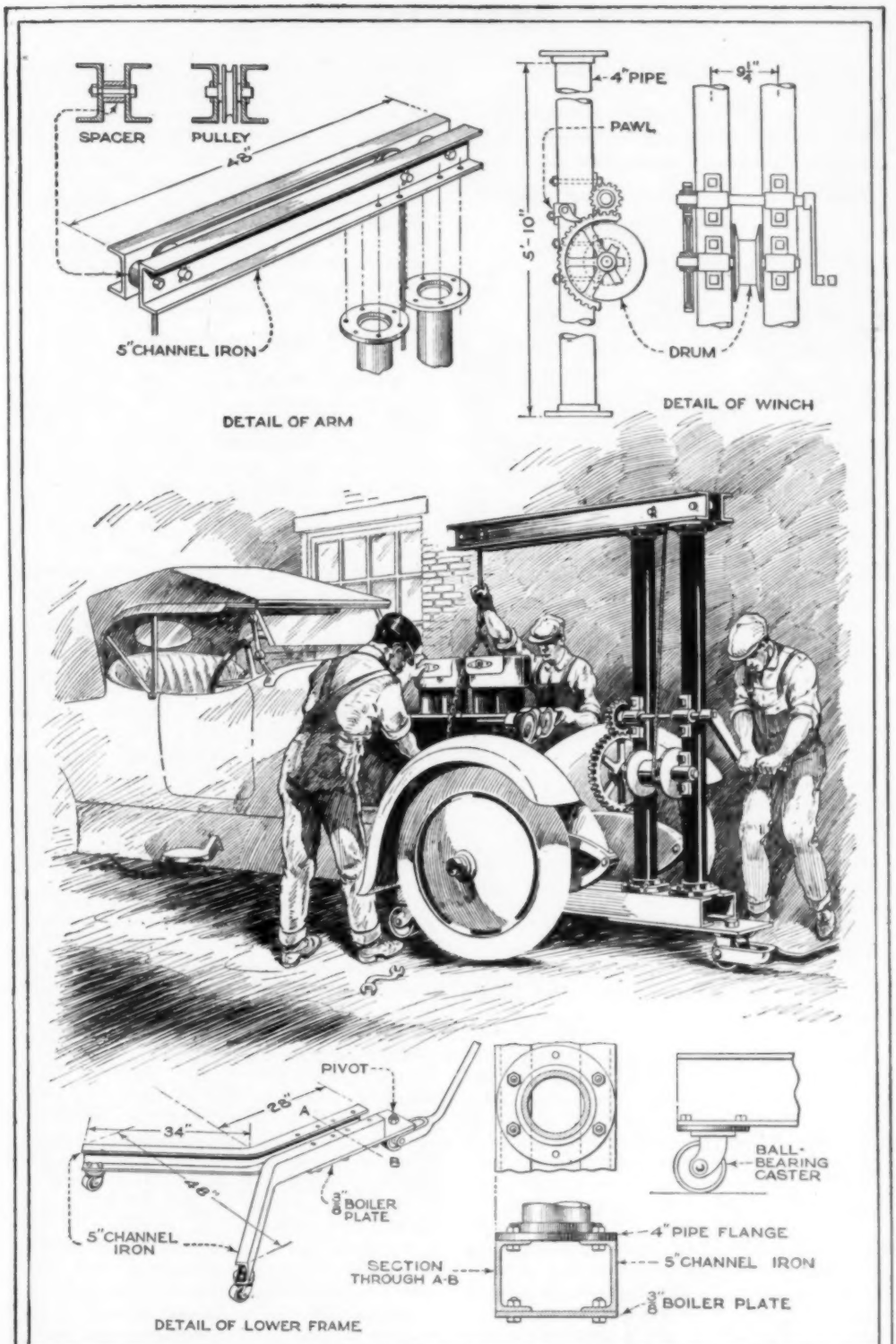
The hoisting mechanism consists of a cast-iron drum, mounted on a shaft carried in small pillow blocks on the columns. The bases of the pillow blocks should be machined to fit the curvature of the columns, or, if there is not metal enough in them for this, small plates, curved on one side to fit the columns, and flat on the other, should be used between the blocks and columns. The drum shaft carries a 12 or 14-in. gear at one end, meshing with a 3 or 4-in. gear carried on a shaft above the drum. This shaft is also carried in pillow blocks, fitted as before, and is provided with a strong crank handle. The assembly is bolted to the columns, with ½-in. through bolts, at a convenient operating height, the pillow blocks being spaced so that the gears will mesh with the minimum of backlash, while still running free. A bent bracket, made of ⅜-in. steel plate, is bolted to the back of one of the columns, and carries a pawl which engages with the large gear, and holds the load when hoisted.

Either a cable or chain may be used; if a cable, it should be of plow steel, not less than ⅜ in. in diameter, and if a chain is used, it should be strong enough to sustain a load of at least 800 pounds.

Most of the material for this exceedingly useful tool can be picked up at a junk dealer's for a few cents a pound; the work of cutting and assembling is quite simple, and may be done in the men's spare time, if necessary.

Cement for Auto-Top Repairs

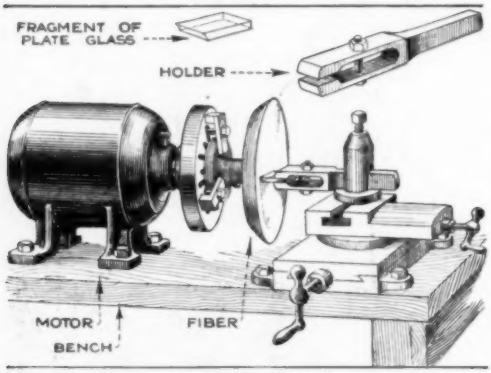
Many autoists repair a torn top with a piece of rubberized fabric and tube cement; it is found, however, that the cement deteriorates in time under exposure to weather. By substituting shellac for the cement, the repair can be made practically permanent. The portion of the top to be covered should be cleaned thoroughly, and the shellac should be spread so that there will be no spaces under the edges.



A Floor Crane That may be Constructed of Material Found in Any Junk Yard, and That will Very Quickly Pay for the Time Spent in Making It, by the Time Saved When Heavy Work must be Lifted

Turning Hard Rubber

Anyone who has had experience in turning hard rubber, ebonite, and bakelite, knows how difficult it is to keep the edges on the steel tools, and to produce a finely burnished surface. The tool dulls rapidly, and drags the surface of the material, so that the work presents a ragged appearance.

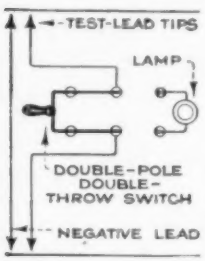


Method of Cutting and Facing Hard Rubber with Pieces of Pla.e Glass

The difficulty can be avoided to a great extent by using a small piece of plate glass as a cutting tool; this has been found to give excellent results, both in cutting and in surfacing the work. The piece of glass is clamped in a toolholder of the design illustrated in the upper detail. The cutting edge is obtained by fracturing the glass; when this is dull a new break is made. Pieces of heavy glass broken from bottles can also be used but cannot be held so easily in the toolholder.

Convenient Arrangement for Test Leads

There are usually two pairs of test leads on the workbench of an electric repair shop; one pair is connected in series with a lamp, and the other pair tapped directly to the line, to obtain full-line voltage when testing small motors and heating appliances. A very simple method of obtaining the same result with one pair of test leads is shown in the illustration.



A double-pole double-throw knife switch is used. One of the center terminals is connected to the positive line, and the other to the test lead. The two terminals on one side of the switch are connected to a lamp, and those on the other side are short-circuited. The other test lead is tapped directly to the negative line. By throwing in the switch on one side, the lamp is put in series with the test leads; by throwing it in on the other side, as shown in the illustration, the full-line voltage is obtained. When the switch is open, the positive lead is dead.

Marking Celluloid

A simple and effective method of marking one's name on any celluloid article, such as a draftsman's triangle, is to letter the name neatly on the surface of the celluloid with black drawing ink, and then, after inverting the triangle, to focus the sun rays with a reading glass on the written portion. After this is done the ink is washed off and a neat replica of the writing will be left on the celluloid surface.—O. S. Sawn, Worcester, Mass.

Corner Studs for Frame Houses

The large cracks appearing in the plaster at the corners of the walls of frame houses are very often due to the fact that the corners are not well made, properly braced, or strong enough.

For the sake of economy it is common practice to use two 2 by 4-in. studs, arranged as shown in Fig. 1, with two small lathing strips nailed at the inside corner of the inner stud. Another poor method is shown in Fig. 2, in which the corner studs are placed so that the edges butt together with a 4 by 4-in. space in the corner between the studs and the sheathing. Fig. 3 shows a good construction of a corner, using three 2 by 4-in. studs. The center stud, spiked firmly between the other two, projects about ⅛ of its width so that the lath can be nailed to it, or a 2 by 6-in. piece of

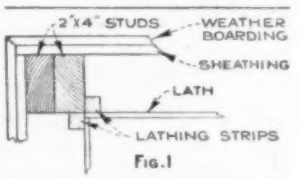


Fig. 1

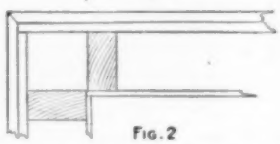


Fig. 2

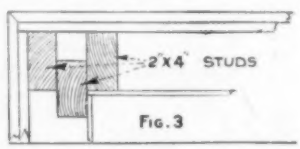
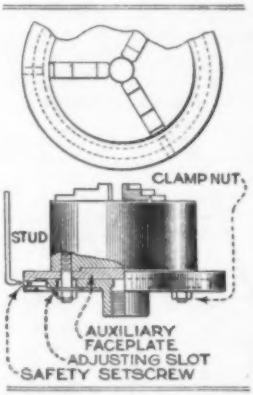


Fig. 3

timber may be used for the center member. This construction is about twice as strong as either of the two shown in Figs. 1 and 2, and only one extra stud for each corner is required. Strength should always be insisted upon in the details of frame houses, especially when the additional cost is slight.—John N. Sioussa, Washington, D. C.

Adjustable Universal Chuck

The illustration shows how a universal chuck may be fitted to act as an independent chuck, and, within limits, as an eccentric chuck; this method may also be used as a means of adjustment for a chuck out of true. A plain cast-iron faceplate, with a heavy flange, is screwed to the spindle nose and trued in the usual manner. Holes are drilled, or, better, slots cut through it for the studs that hold the chuck; if holes are used, they are made a little larger in diameter than the bolts, to allow the chuck to be moved across the faceplate. An auxiliary faceplate is then made up, as shown, and recessed to fit the smaller one; 3 or 4 holes are drilled and tapped in the periphery, to fit safety setscrews tightening against the smaller plate. The auxiliary faceplate is also provided with a shallow boss, which is made a push fit in the chuck counterbore.

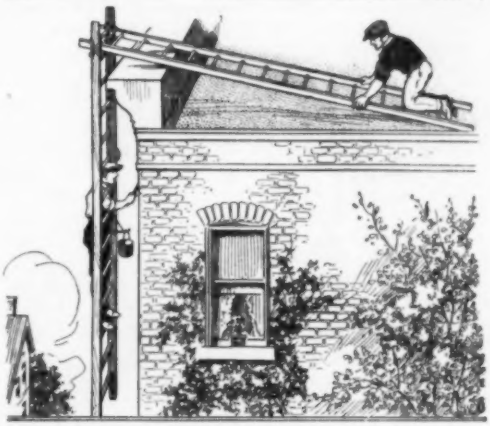


To center the work held in the chuck, or to set it eccentrically, the nuts on the studs holding the chuck and auxiliary faceplate are loosened slightly, and the setscrews adjusted until the work runs true; the nuts are then tightened. In case the lathe nose becomes inaccurate, the auxiliary plate and chuck are removed, and the smaller plate faced true; the chuck is then replaced and adjusted by means of an indicator.

¶A good liquid tire paint is made by mixing 5 lb. whiting in 1 qt. gasoline, and, when thoroughly mixed, adding 1 qt. rubber cement. It is applied to the tire with a brush, and will not crack or chip, due to the elasticity of the rubber cement.

Working on Side of Building

The method of working on the wall of a building as shown in the illustration is used by circus-bill posters to put up their signs in places that are otherwise nearly inaccessible. Two ladders are used; one is laid on the roof, and projects a few feet beyond the edge; the other is lashed to the projecting end, and hangs vertically. One man remains on the extreme inner end of the horizontal ladder, while another climbs down the vertical ladder, the weight of the first man keeping the whole arrangement in position. The horizontal ladder should not project over the edge of the roof more than ¼ or ⅓ of the entire length of this ladder and the man holding it down must apply his weight at the extreme inner end; he must be about equal to the other man in weight. In this way he will be able to hold the man on the ladder securely.



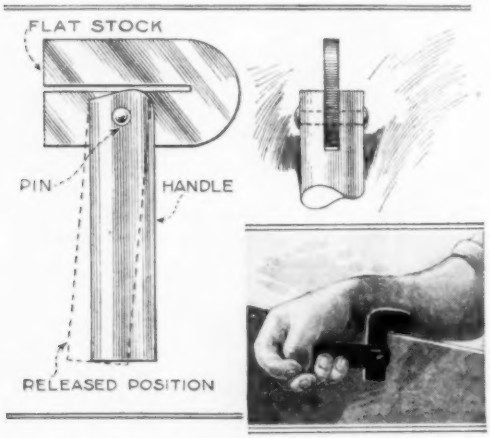
A Practical Application of the Lever for Working on the Side of a Building

Painting Inside of Conductor Piping

Conductor piping rusts much more rapidly than the gutters, and for this reason it should be painted on the inside, which will protect it for a long time. The painting can conveniently be done by means of a sponge drawn up through the piping on a length of rope or heavy twine. The rope should be long enough to extend up through the inside of the piping and down to the ground on the outside, so that, when the rope has once been passed through the pipe, the remainder of the work can be done from below. A large sponge is tied to the rope and a weight tied under the sponge.

Carrying Sheet Metal

Where pieces of sheet metal have to be carried for short distances by hand, the device shown in the illustration will be found useful. For a handle, a short



A Simple Holder That Enables Sheet Metal to be Carried with Ease

piece of round stock is used; this is slotted at one end to take a piece of flat steel with a slot sawed in it to take the work. Both parts of the tool are held together by means of a pin. The end of the handle projecting over the slot in the flat piece is filed to the shape shown to form a cam. The handle will, when pulled upward, hold the sheet securely in the slot, and the weight of the material will also tend to tighten the grip of the holder. In use, the sheet is gripped so that the handle projects away from the workman. When carried in this manner the sheet swings slightly away from the worker's feet and clears the floor much better than if carried straight.

Lubricating Automobile Springs

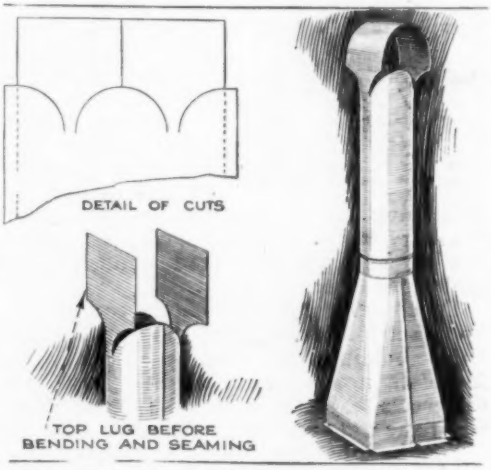
Authorities on automobile maintenance agree that graphite is by far the best spring lubricant. Many motorists, however, refrain from using graphite because of the difficulty of getting it between the springs without taking the springs apart. A very simple and easy method of efficiently lubricating automobile springs with graphite is as follows:

Take about 2 oz. of powdered graphite and mix it in 4 oz. of ordinary commercial ether. Put the mixture into an oil-can and apply it to the springs; it will be found to flow readily between the tightest leaves. The ether evaporates quickly and leaves behind a deposit of graphite. The graphite left on the outside of the springs may be wiped off with a cloth.

Since ether is poisonous if taken internally, it should be mixed and applied to the springs out in the fresh air where there is not the slightest danger of inhaling it. It is also highly inflammable, and care should be taken to keep it away from fire.

One-Piece Chimney-Extension Cap

The drawing shows a one-piece chimney-extension cap that may be cut with little or no waste from a sheet of galvanized iron. The method of cutting is shown in the upper left-hand detail. The cylindrical part is first formed and the edges carefully seamed. The top flaps are then bent over, seamed and soldered, which completes the cap. If it is not thought necessary to have both sides exactly symmetrical, the extra allowance on the sides of the body for seaming may be omitted, and the sheet cut straight as indicated by the dotted lines. When the body is seamed, the upper curve on one side will be a little smaller than that on the other, but this is hardly noticeable, and allows the sheet to be cut with no



A One-Piece Chimney Extension Cap That may be Cut without Any Waste

waste at all. The cap not only forms a protection over the chimney, but also tends to increase the draft.—Francis T. Griffin, North Bend, Neb.

When broaching, see that all chips are removed before placing a new piece of work on the broach.

A Heavy-Duty Bench Band Saw

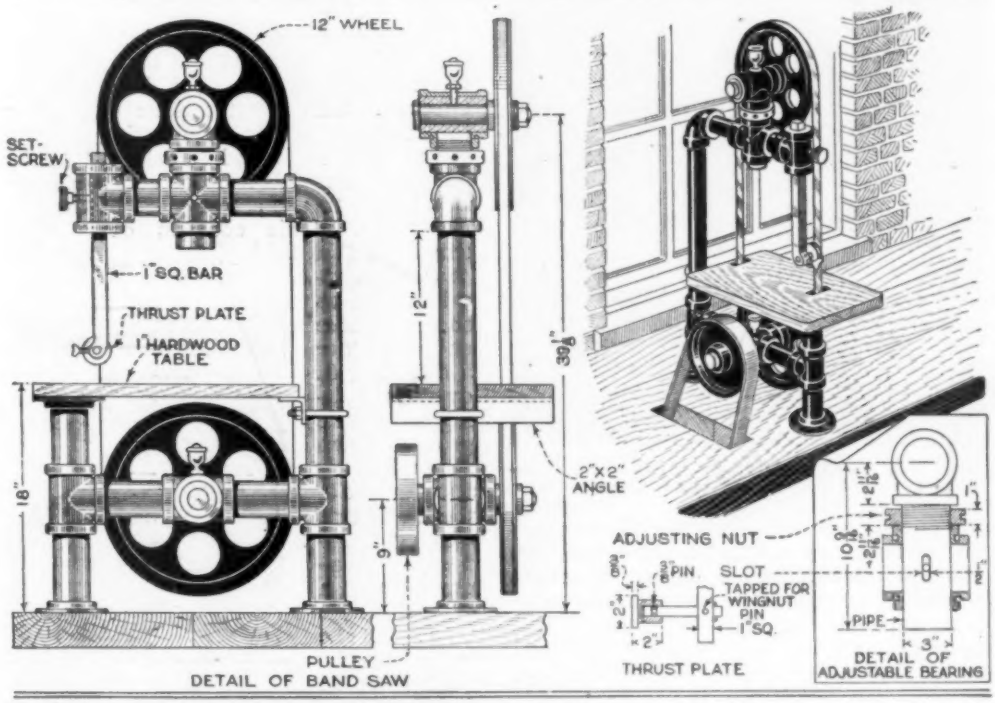
BY FRANK N. COAKLEY

THE band saw shown in the accompanying drawing is built up mainly from the most easily obtained of materials — pipe and fittings; it will be found a most practical tool for the small shop, and one capable of heavy work.

The method of assembling the 2½-in. pipe frame is quite apparent from the drawing, so nothing need be said about this. The bearing for the bottom-pulley shaft is a babbitted cross, reamed to fit a 1½-in. cold-rolled steel shaft; an oil hole is drilled and tapped in the side of the cross, at the top, and an oil cup fitted to lubricate the shaft. The top-pulley shaft bearing is a tee, babbitted and reamed, in the same manner as the lower bearing, for a 1½-in. pin. This bearing is made adjustable, as shown in the sectional drawing, by screwing a 3-in. bar, with a long thread, into the tee outlet. The bar slides in one pair of the outlets of a 2½-in. cross, the outlets being machined to a good fit on the bar. A ½-in. pin is riveted through the cross, and fits in a slot cut through the bar; this keeps the bearing in alinement. A 5-in. circular adjusting nut, tapped to fit the bar, is run on between tee and cross before the bearing is assembled; this nut has eight ⅜-in. holes drilled around its circumference for a spanner wrench. If a bar of the proper size is not available, the sliding piece may be made of double extra-heavy pipe, turned to size. Care must be taken, when assembling the frame, to get the upper and lower bearings in line, and square with each other.

The thrust plate is made from 2-in. cold-rolled steel, turned to shape, bored to fit a ¾-in. pin, and casehardened. The pin has a groove turned in it near its end, and a ⅜-in. pin, driven through holes bored in the thrust plate, runs in the groove and keeps the plate in place. The pin is carried by a 1-in. square bar, which runs through a babbitted hole in the end tee of the frame, and is held by a ⅝-in. setscrew with a large knurled head; the ¾-in. thrust-plate pin is held by a ½-in. thumbscrew.

The table is made of 1-in. hardwood; it rests, at the front, on a pipe flange



Pipe and Fittings, About the Most Easily Obtained of Materials, are Used Exclusively for the Frame of This Sturdy Bench Band Saw for the Small Shop

screwed on the frame member, and, at the rear, is screwed to a 2 by 2-in. angle iron, which is fastened to the frame by a U-bolt.

The saw pulleys should be ¾-in. face by 12-in. diameter, and should be turned and balanced to insure vibrationless running. It is advisable to cement endless rubber bands to the pulleys, to prevent the saw from slipping and heating. The driving pulley should have a 2¼-in. face, and be of such a diameter that the saw pulleys will run at 500 to 600 r. p. m. Saw pulleys up to 15 in. in diameter can be used by proportioning the frame to suit. A ⅜-in. saw will be found to be the best size for all-around woodworking. The feet of the machine are pipe flanges, and lag screws, or bolts, are used to fasten it to the bench.

Assembly Stand for Automobile Axles

To allow the workman full use of both hands in assembling the front axles of automobiles, the simple stand shown in

Stand Used for Assembling Front Axles of Automobiles That Facilitates the Work Considerably

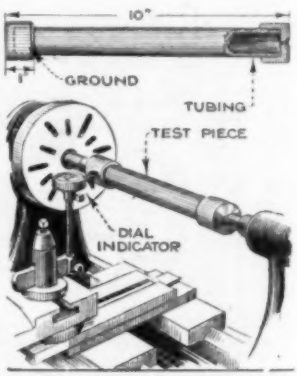
the photograph was devised. The spring-perch holes in the axle slip over two studs on two separate stands; then the workman can perform the necessary operations, knowing that the axle is just as rigid as if it were actually fastened to the automobile.—J. H. Moore, Toronto, Canada.

Protecting Drawings

Ordinary transparent lacquer used for coating brass and other metals can also be applied to paper reference sheets, tables, drawings, etc., to protect them from being soiled by handling. The lacquer is poured into a shallow tray, and the sheets are dipped so that both sides are thoroughly coated, then hung up to dry. If desired, another coating can be applied after the first has dried. The lacquer covers the paper without affecting the printed matter, and it toughens and glazes the surface so that it will not collect dirt so quickly. It also prevents the paper from being stained or torn easily.

A Lathe Test Piece

When mounting a lathe job that is to run perfectly straight and true the alinement of the centers should be carefully checked. This is often done by running the centers together, or by using a thread gauge with male and female 60° angles, but these methods are not very accurate; it is better to use a test piece of the type illustrated. This consists of a 10-in. length of 1-in. tubing, fitting snugly into two steel endpieces, as shown. These endpieces are a driving fit over the tubing and are ground down after being assembled, the centers being carefully machined with a single-edge tool while running the test piece in the chuck and steady rest. The sides of the endpieces are also trued. As the head center rotates, it is always well to run the lathe, and to hold the test piece by hand in order to keep it from rotating. A dial indicator is brought to bear on the side of one endpiece, as shown, and after registering the position of the needle, the dial is moved over to the other end, which is similarly checked; the dial needle will check alike at both ends if the centers are in perfect line. By using a test piece of this kind, considerable guesswork will be eliminated, and the accuracy of the job assured.—J. V. Romig, Allentown, Pa.



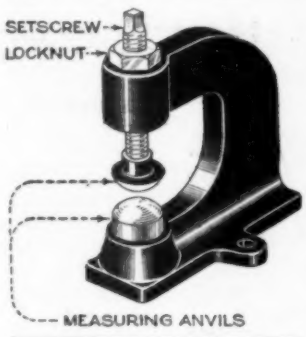
Locking Door-Knob Screws

The small setscrew used to hold a door knob in place on the lock shank often works loose and is lost. Although replacement of a few screws is not expensive, it is troublesome, and in large buildings, where this trouble happens often, it is advisable to prevent frequent recurrence by placing small lock washers under the heads of the screws.

Safety Gauge for Punch Press

It frequently happens that a punch-press operator places two blanks into the forming die instead of one, the result being that either the die or the press is broken. This accident usually occurs when blanks are stuck together with a layer of oil, and the double thickness is not readily noticed. Furthermore, piecework rates, which are usually paid for press work, are not generally conducive to giving the work close inspection.

To avoid the danger of breaking dies and presses in this way, I designed an adjustable safety gauge that is bolted on the punch-press table in a position convenient to the operator, who passes each blank between the measuring anvils before placing it in the forming die. The anvils are spaced to allow the passage of only one blank. Although the use of the gauge slows up production somewhat, not so much time is lost as when dies and presses are laid up for repairs. The elimination of repair costs also enables the firm to raise piecework rates.

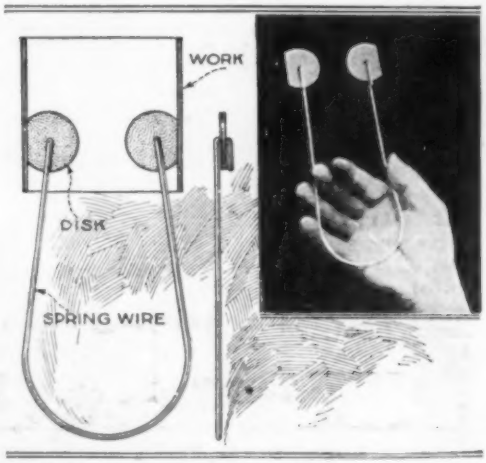


The gauge has a flat cast-iron base, with lugs for bolts. Both measuring anvils have round faces to permit the easy passage of the blanks. The anvils are made of tool steel, hardened, and the upper one is threaded and provided with a locknut.—Chas. Homewood, Ontario, California.

¶Wood that has been thoroughly soaked in an almost saturated solution of salt and water, and then dried, will not warp.

Tool for Handling Light Work

A piece of wire bent to a U-shape is often used to hold light tubular work for minor operations, such as dipping, tinning, etc., where the full outside surface must be exposed. The illustration shows an improvement on this type of holder. The improvement consists in the addition of two disks, each flattened on the edge and drilled in the center to fit the wire; the ends of the wire are bent, pushed through the holes, and bent again, so that the disks are free to revolve, but cannot come off. The flattened sides of the disks make a much better contact with the work than wire alone, and one tool of this kind will serve for many sizes of work, while, when using the U-shaped wire only, several different sizes must be made to handle any large variety.—Harry Moore, Montreal, Can.



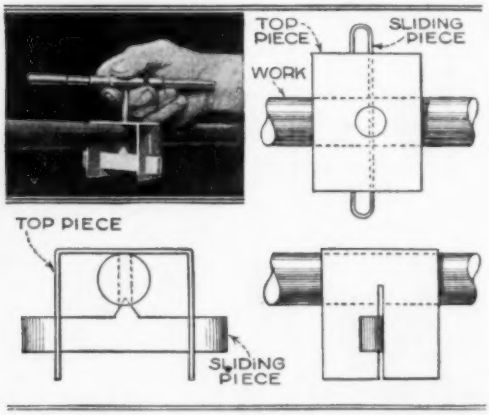
A Simple Holder for Handling Light Tubular Work for Such Operations as Dipping and Tinning

Removing Large Scrap Casings from Rims

To remove a scrap 40 by 8-in. casing from the rim in a short time, cut into the tire from the outer side, about 2 in. above the bead. Cut at an angle through the rubber and through the cords and keep on cutting all the way around the tire. The outer sidewall can then easily be pulled out to remove the inner tube and the flap, after which the casing can be taken off the rim without much trouble. This process takes about 30 minutes, while the ordinary method often takes from 2 to 5 hours.—Harold L. Fox, Atlantic City, N. J.

Tapping Round Work

It is usually more difficult to keep a tap straight and square on round work than on flat work, as there is nothing to guide the eye. The illustration shows a tap guide, made of flat stock, that aids in tapping holes straight in such work. One piece is bent at right angles on two sides, drilled with a clearance hole for the tap in the center, and a slot is sawed up each side. The second piece is made to slide up and down in the slots; the center is cut to a V-shape, and the ends are turned over to bear against the sides of the first piece so that both parts are held in line by the spring effect. To use the device as a guide it is slipped over the work and the sliding piece pushed up until the V-shaped point enters the bottom of the hole to be tapped. This movement centers the clearance hole in the top over the hole in the work, and brings the upper surface to a square position so that the tap can be guided straight with the eye. If greater accuracy is desired, a square can be used, with the stock resting on the flat upper surface of the guide.



A Simple Guide Used for Tapping Round Work Square and Straight

Testing Silk

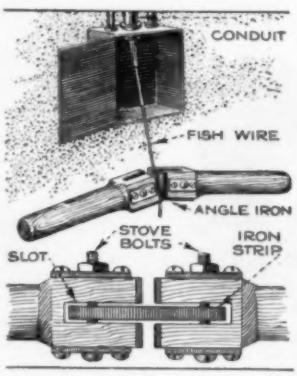
Silk fabrics are often "loaded" to give them the appearance and feel of heavy fabric, because a loaded silk is cheaper to produce than a piece of goods that is made entirely of silk and is of the same weight. The loading process generally consists in impregnating the silk with metallic salts, such as tin and lead. A chemical action is set up in the fiber by this process which weakens the goods to some extent; furthermore, when the loading materials have been removed from the fabric by washing, the garment is in many cases practically ruined. Loading also causes the silks to crack and split at folds and creases.

A simple method of detecting silks that have been treated with metallic salts is a burning test. A piece of pure silk, when burned, will shrivel up into a bunch in the same way as wool. If metallic salts are used, the silk will not shrivel up, but the ash will retain its original shape and pattern, and can often be handled without breaking, depending on the amount of loading that has been done.

Handy Fish-Wire Puller

It is a very tiresome job to pull fish wire through conduit by means of pliers, and it is not advisable to wrap it around a stick, as this is liable to ruin it. A puller of the type illustrated has therefore been found of considerable convenience; the harder one pulls on it the tighter it will grip the wire without injuring it, whether the wire is flat or round.

The handles are cut from pieces of wood about 2 in. square and 12 in. long. Part of each handle is rounded off to make a comfortable grip for the hand, and the square ends of the handles are slotted to receive a strip of flat iron, which acts as a hinge. Pieces of angle iron with slots cut across them to correspond with those cut in the handles, are fastened to the ends by means of flat-head wood screws, the sharp corners or edges of the angles being slightly rounded with a file, so that they will not cut the fish wire. A small piece of flat iron is screwed to each side of the handles to take the strain off the hinge, which is held by two stove bolts passing through the handles as shown.—W. W. Parker, Lead, S. D.



¶All open flames should be kept away from any place where there is any possibility of acetylene escaping.

A Good Wire-Fence Straightener

BY J. R. KOONTZ

EVERY farm and ranch owner, in fact anyone who has occasion to use wire fencing, knows how soon it is bent and forced out of shape by horses, hogs, and cattle tramping or crowding it down in order to get grass, etc., that may be on the opposite side. In a short time the fence becomes unsightly, and if allowed to stay without straightening will become more of a nuisance than anything else.

The wires can be straightened with the hands, but, with heavy wire it is a difficult job, and painful to the hands, and, when much of it must be done, the enforced bending posture causes a pain in the back. With a wire straightener these aches and pains may be avoided, and the fence straightened much easier, thus transforming a difficult job, and one that is put off as long as possible, into an easy one.

Left, Parts for the Wire-Fence Straightener; Center, Tool in Use; Right, Assembled Fence Straightener

A straightener of the type shown in the illustration can be made at practically no cost, beyond that of the labor, from materials usually to be found in the junk heap. Two handles, taken from an old plow or cultivator, are used, or, if only a single-hook tool is desired, the handle of a discarded lawn mower will serve. The handles are cut to 30 in. long; two round braces or struts, 10 in. long, which may be taken from an old chair; two pieces of flat tire iron, 20 in. long, and two pieces of tire iron 10 in. long, are also necessary, in addition to eight wood screws and one iron rivet.

A hook is bent on one end of each of the 10-in. irons, and two screw holes are drilled in each, so that they can be fastened to the lower ends of the handles as shown. Screw holes are also drilled at the ends of the 20-in. pieces, and a hole for the rivet in the center of each. Holes are bored in the handles for the ends of the chair rails, which are then glued in place between the handles. The 20-in. cross braces may then be attached, and riveted together.

In using the tool, the hooks are placed over the line wires, the foot placed against the stay wire, and the line wire pulled back into shape without stooping.

Coloring Copper Brown and Black

Different shades on copper, ranging from a light brown to a deep black, may be obtained by using a weak solution of liver of sulphur. A half ounce of the liver of sulphur to a gallon of water is sufficient to make a solution strong enough for the brown colors. By increasing the quantity of the chemical, using the same amount of water, and bringing it to the boiling point, the same colors can be produced on brass.

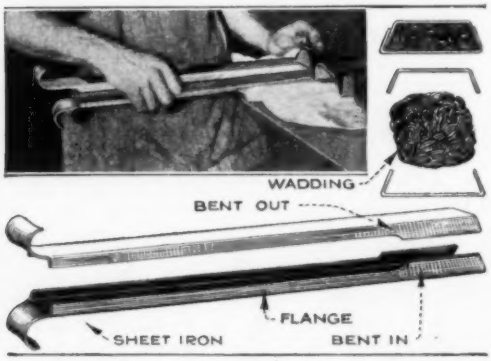
To obtain the popular verd-antique finish, the work is stippled with a solution made from 4 oz. copper nitrate, 4 oz. calcium chloride, and 1 oz. bichromate of soda in 1 gal. of water. After coating the work with this solution, the high lights are rubbed down with a cloth and finely powdered pumice stone, after which lacquer or wax is applied as desired.

Drilling Hardened Steel

I have found the following method for drilling hardened steel very satisfactory. The usual pointed end of the drill is ground to a half-round shape, then made as hard as possible. The surface to be drilled is etched with dilute muriatic acid. Instead of oil, turpentine or kerosene in which a little gum camphor has been dissolved is used as a lubricant. Should the bottom of the hole become polished, so that the drill rides over it, remove the drill, etch the bottom of the hole with the acid, to roughen it, and proceed as before. —Wm. J. Edmonds, Rutland, Vt.

Auto Upholsterer's Stuffing Tool

It is common practice among automobile upholsterers, when filling pleated seat backs, to lay in a roll of wadding and



Auto Upholsterer's Stuffing Tool Permits Pleats to be Sewed First and Stuffed Afterward

sew the covering over it as they go. The process, which is a slow one, may be greatly facilitated by the simple stuffing tool illustrated, which permits the pleats to be sewed first and stuffed afterward.

The tool consists of two strips of sheet iron 31 in. in length; the width at one end is 5 in., for a length of about 2 in., and the remainder of the strip is 4 in. wide. The edges are bent over as shown to form flanges, then the flanges are cut off at one end of each piece, and the strips bent over to form handles, which are stiffened with ridges of solder. At the wide end of the tool, the flanges of one section are bent outward and those of the other section inward so that one may slide within the other. In use, the roll of stuffing is placed in the tool and slipped inside the pleat. By pulling the outer section back 2 in. the locking portions of the flanges slide clear, and the tool can be removed without difficulty.—Edwin M. Love, Alhambra, Calif.

Instructions Cast on Machines

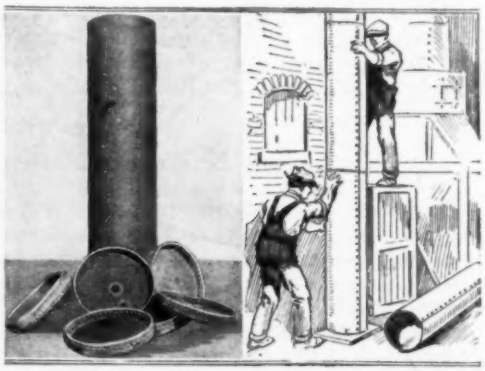
On many machines it is necessary to attach a plate of instructions or warning so that they can be operated safely. Enameled plates are often used, but are not satisfactory because the enamel splinters. Etched and engraved brass plates give satisfactory service, but, as they are detachable, are often lost. The most permanent method of providing instructions is to cast the lettering on the frame. This is done by embossing the desired lettering on narrow aluminum strips and nailing these to the surface of the pattern. The location is determined simply by reference to the parting of the mold, so that the lettering will not be obliterated in the molding process. The finished casting is ground to even up the tops of the letters and make them conspicuous.

Identifying Scaffold Lumber

Many contractors, and others having use for scaffolds at regular intervals, use special lumber for the purpose, particularly for the footboards. The material is generally 2-in. lumber and is selected for its freedom from knots and other defects. The ends of these boards are painted a conspicuous color so that they can readily be identified in a pile of lumber, should they get misplaced, but they are usually kept in a separate pile.

Smokestack Made from Old Kitchen Boilers

When installing a new furnace it was learned that the 40-ft. smokestack which was required would cost approximately $40.00. Instead of paying this price, eight old kitchen boilers were bought for 50 cents each at a scrap yard. The ends were cut off with an acetylene torch in an hour's time and the small openings in the sides were plugged. One end of each



Left, Boiler with Ends Cut Off; Right, Erecting the Smokestack

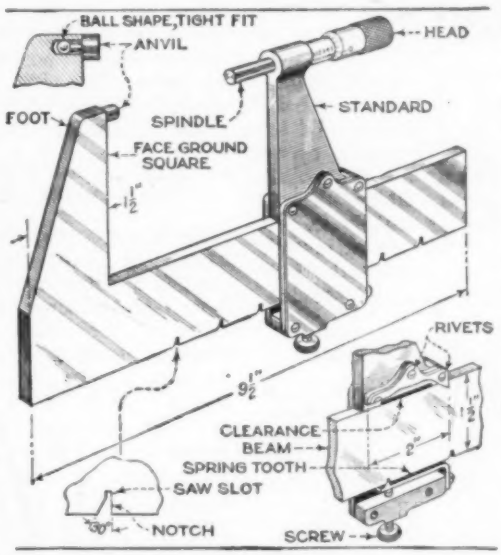
tube was hammered down so that it would fit into the end of another section, and the sections riveted and welded to each other. The smokestack made of these boilers was heavier than one made of the usual material, not to speak of the saving in cost effected in this way.—J. E. Holstrom, Knoxville, Tenn.

Making a Beam Micrometer

The cost of a complete set of micrometer calipers prohibits the average toolmaker or machinist from owning one; a beam micrometer also, while not so expensive as a complete set, is beyond the reach of many. With the exercise of a little skill, however, accurate beam micrometers may readily be made by the workman himself.

The toolmaker, and others whose work demands an accurate tool, will find the micrometer shown in the larger drawing well worth making, as it can be made just as accurate as any of the high-priced tools on the market.

The beam or frame is made of ¼-in. steel, 9½ in. long and 5 or 6 in. wide, depending upon how high it is desired to make the spindle and anvil. This height should be either 3 or 4 in., and the width of the beam 1½ in. The inner edges of the foot and beam must be absolutely true and square with each other, if the tool is to be accurate, and great care must be taken with this part of the work. The foot is drilled for the anvil, which is of tool steel, made, as shown in the sectional detail, with a ball-shaped end and a shank smaller in diameter than the hole. This allows the inner face of the anvil to seat squarely against the surface of the foot; the ball must be a tight press fit.



Beam Micrometer, Measuring from 0 to 6 Inches, That may be Made by Any Skilled Workman

The micrometer-head standard is built up of flat steel, the upper part, carrying the head, being shaped from ½-in. stock, leaving the diameter of the eye ½ in., and the body ¼ in. thick. This is connected to the bottom piece by ⅛-in. side plates, the whole being assembled tightly by perfect-fitting rivets, neatly headed. A clearance slot is filed in the bottom surface of the upper part of the standard, so that it has a two-point bearing on the beam.

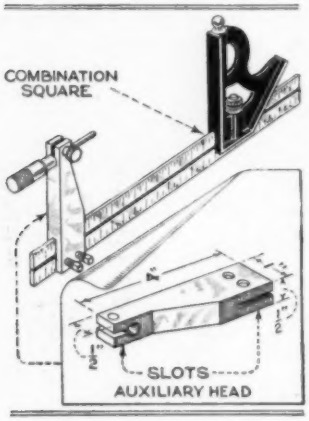
The locating spring tooth is made of tool steel, hardened and tempered, and is fastened to the bottom piece by a round-head screw. The shape of the notches in which the tooth rests should be particularly noticed. This form of notch divides the work of locating the standard and of drawing it to position. When the screw is turned upward to press the tooth home, the inclined side of the notch, engaging with the corresponding side of the tooth, slides the standard until the straight sides of notch and tooth are in contact. It is only necessary to make the straight sides of the notches accurate as to location, and, as all of the wear comes on the inclined side, this accuracy is retained indefinitely. When the screw is released, the tooth will spring out of the notch with a little end pressure. The micrometer head is lightly pressed into the eye in the standard in the usual manner, and the contact surfaces of the anvil and spindle lapped true.

Where extreme accuracy is not essential, a micrometer head, attached by means of a simple bracket, or auxiliary head, to the scale of a combination square, will serve the purpose, the head of the square being used as the anvil. It is preferable to use a square with a hardened, drop-forged steel head.

The auxiliary head is made from a piece of cast iron or steel, ½ by 1 by 4 in. in dimensions, machined all over by the size given in the smaller drawing. A hole to fit a standard micrometer head is then drilled through it, and, at right angles to this, a hole is drilled and tapped for a binding screw, the head slotted as shown, and one side of the binding-screw hole drilled out to fit the body of the screw; the screw used has a knurled head. The bottom of the head is now slotted to fit nicely on the scale, holes for two small setscrews are drilled and tapped in one side, in line with the scale groove, and the screws fitted.

To use the tool, the square head is set on a scale division, and, with the microm-

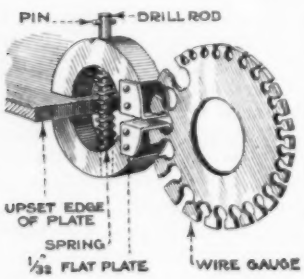
eter reading at zero, the auxiliary head is moved up, until the end of the spindle just touches the square head, and locked in position. The square head is then moved the desired number of divisions, locked, and the micrometer used as usual. When setting the head on the scale divisions, a magnifying glass should be used.



A better way to set the tool is to use a set of the micrometer standards sold by various tool companies, but where these are not available, the magnifying glass will enable the workman to set the tool as closely as the ordinary vernier caliper may be adjusted. A tool of this kind has been used for a long time, and has given splendid service.

Wire Gauge Attachment for Plates

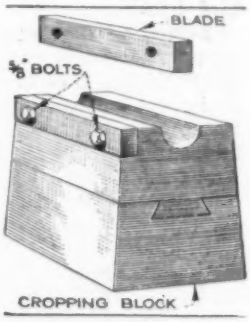
Steel and iron plates are very seldom accurate as to thickness at their edges. Sometimes this is caused by the shear turning up the edges, by a saw, which leaves a burr, or perhaps the edges are just badly knocked. For this reason a wire gauge, when used to measure plates, is often unreliable, and the cause of many mistakes, because the actual thickness of the plate may be less than that shown by the gauge. To measure plates accurately they should be gauged at a short distance from their edges. The attachment shown in the illustration accomplishes this in a handy manner when used in conjunction with a wire gauge.



A collar, about ⅜ in. thick, makes a good body for the device. A hole, about ¼ in. in diameter, is drilled through it, and it is then cut in two as shown. A piece of drill rod is driven tightly into the hole in one part, and made a sliding fit in the hole in the other. The faces of both halves are then brought together and filed and lapped true to each other. Two pieces of 1/32-in. sheet steel are bent over to fit the two pieces at one side, and are riveted in place by a couple of pins in each, the faces of the collar pieces at this side being cut away to clear the gauge. To keep the two parts together a small pin is driven through the drill rod, and a shallow groove is filed in the top of the collar in line with the pin, so that the pressure of a light spring around the rod keeps the pin in the groove and prevents the two parts from coming apart when not in use. Any size of plate, from 1/16 in. thick, can be measured with this device, as shown in the drawing; it is recommended that the gauge and attachment be fastened together by means of a short chain, if constantly in use.

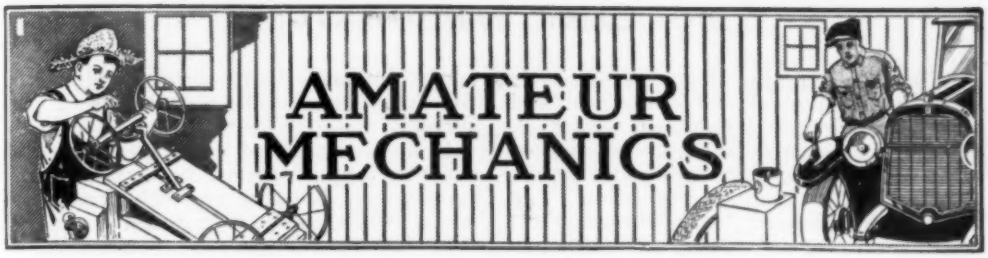
Economizing on Cropping Blocks

It is a general practice in steel manufacturing plants to crop bars of steel before straightening them. This is done on a cast-steel cropping block, and when the edge of the block becomes rounded or chipped, which is caused by heavy cropping, the block is machined down to form a new edge.



An improvement on the ordinary block is made by rabbeting the edge of the block as shown, to a depth of 2½ in. and a width of ¾ in., to form a seat for a removable tool-steel blade which is bolted to the block. The four edges of this blade can be used, and, when the last edge is worn, a new blade can be substituted for the old one. The holes in the blades and the block are drilled 2 in. from each end, and exactly on the center, so that the blade will fit the block and holes exactly in either position. The steel used for the blade should be 80-point carbon tool steel, with a Brinnell hardness of 477.

¶To evaporate 1 cu. ft. of water requires the consumption of 7½ lb. of coal, or about 1 lb. of coal to 1 gal. of water.



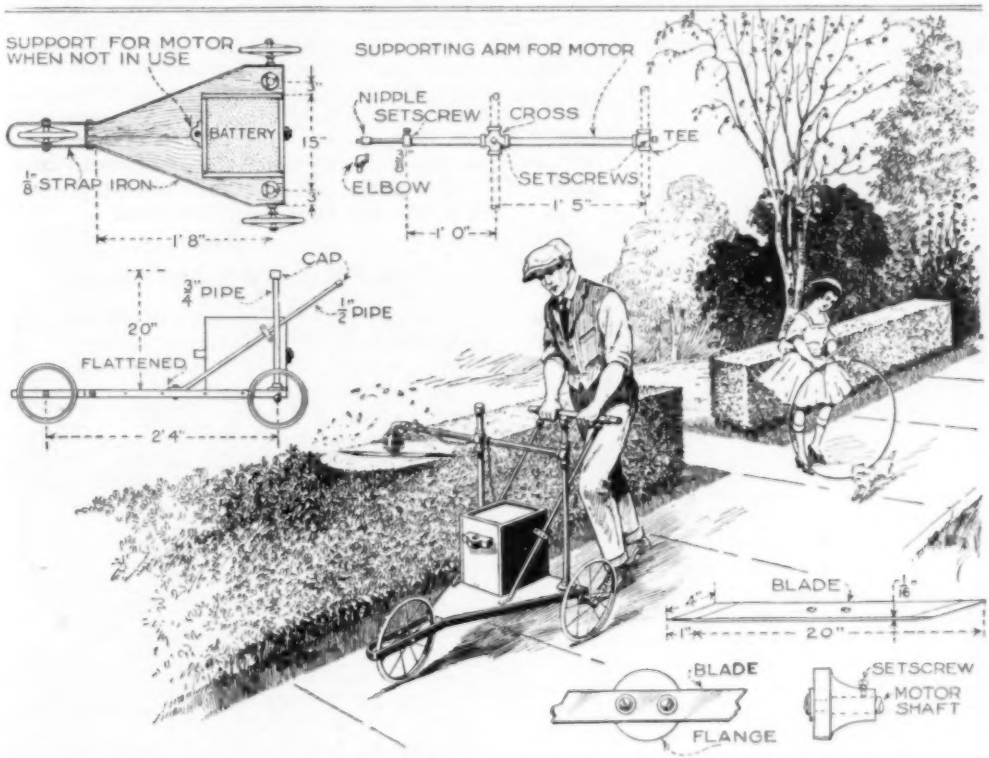
An Electrically Driven Hedge Trimmer

BY A. E. SHAW

A MACHINE that will interest the man who prides himself on his well-kept grounds is the electric hedge-trimmer shown in the illustration. There is no great amount of skill required to build the machine beyond that possessed by the average amateur mechanic, and, besides trimming the hedge very accurately and uniformly, the machine does the work in a much shorter time than it can be done by hand.

The base of the machine is made of 1-in. lumber, which is faced on the edges with ⅛ by 1-in. flat iron. The iron is extended at the front as shown, to form a bearing for the front wheel. The rear-wheel axle is strapped to the underside of the base; the wheels are 12 in. in diameter, rubber-tired.

The supporting frame for the motor is made up from ¾-in. pipe and fittings, the vertical arms being attached to the base by means of floor flanges. The cross arm is fitted with a cross and a tee, from which the threads have been filed so that they will slide easily on the vertical pipes, and they are fitted with setscrews so that the arm can be locked in position.



This Electrically Driven Hedge-Trimming Machine will Delight the Amateur Mechanic Who Prides Himself on the Appearance of His Grounds. It is Easily Made, and Quite Efficient

A coupling, tapped for a setscrew, is screwed on the outer end of the arm, and a smaller pipe is telescoped within it. This pipe is threaded at the outer end, or fitted with a reducing coupling and nipple, to screw into the base of the motor. The size of this pipe and the thread used will depend on the motor available. For trimming the top of the hedge, the motor is mounted at right angles to the cross arm, the elbow shown being used for this purpose.

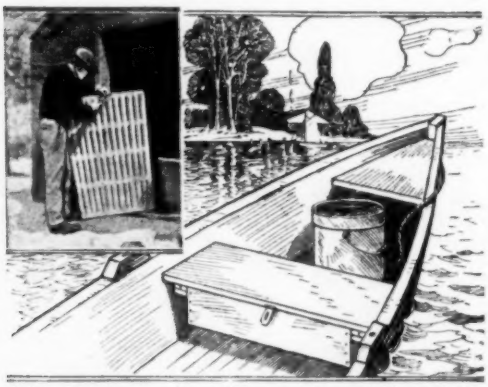
The motor is a small battery motor, which develops about 1/15 hp. at 1,800 r. p. m., on 6 volts, and it is fitted with a tool-steel blade, ground to the shape and dimensions given in the drawings, and carried on the motor shaft by means of a machine-steel flange, drilled and tapped for two round-head screws and a setscrew.

It has been found convenient to drive the outfit by a storage battery mounted on the base, but it is perfectly feasible to use a 110-volt motor, provided a connection can conveniently be made. When the motor is not in use it is removed, with its supporting pipe, and carried in the bracket screwed to the front of the battery box.

The handle of the machine is made of 3/4-in. pipe and fittings, the lower end of each leg being flattened and screwed to the base, and each leg is attached also to the side of the battery box with pipe straps.

Improvements for a Fishing Boat

A tackle box fitted in the seat of a rowboat has many advantages over an ordinary tackle box, as it has not only much more room and cannot be knocked



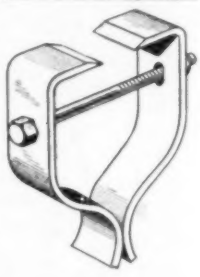
Left, Making a Slat Floor for the Fishing Boat; Right, Tackle Box Built under Seat

around, but is kept completely out of the way. As shown in the drawing, the tackle box is made in the form of a drawer under the center seat, the one that is usually used the most. The drawer is about 30 in. long, 6½ in. deep, and 12 in. wide, which gives plenty of room for two or three rods, and compartments for hooks and lures, so that these will not become mixed, as is generally the case in the ordinary tackle box. The box is protected from rain by the seat, and as it does not touch the bottom it is also free from water in the boat. A hasp and padlock should be provided on the box.

Another improvement for the boat is a slat flooring to prevent getting the feet wet. For convenience the flooring can be arranged in three sections. The construction is simple, all that is necessary being a quantity of slats and a few cross members. The best wood to use is fir, and the flooring should never be painted, but should be given a liberal application of linseed oil. The slats, so protected, will last a long time. In addition to keeping the feet dry, the slat flooring protects the bottom boards of the boat.

Simple Homemade Leaf Spreader

To lubricate the springs of an automobile properly it is necessary to loosen the clips and spread the leaves apart for the insertion of the lubricant. There are many methods of doing this, but the tool shown in the sketch will do the work with a minimum of effort. It is made from two pieces of a broken spring, bent as shown. The ends are ground to a knife-edge for wedging between the leaves; by tightening up the nut in the bolt the knife-edges are drawn together, separating the spring leaves. The bolt holes must be elongated to prevent the bolt from binding.

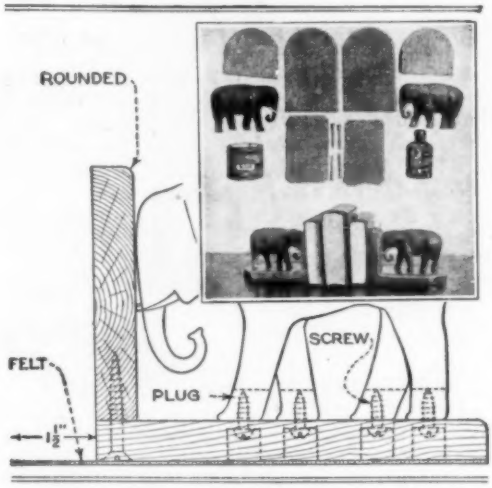


¶ By fixing an 18 or 20-in. extension to his cane, a blind man has greatly increased its usefulness. Because of the increased length he is able to notice obstacles within a much greater radius.

Inexpensive Book Ends

A neat pair of ornamental book ends, which are just as presentable in appearance as many of the expensive ones on the market, can easily be made at home for a fraction of the cost of the manufactured article.

The wooden base and vertical part of each end are cut from 1 by 5-in. finished lumber, to the shape shown in the details of the photograph. The two parts are joined with 2-in. wood screws, small holes being drilled to prevent the screws from splitting the wood. Two small celluloid statuettes, such as elephants, which cost only 10 or 25 cents each, are obtained. The statuettes are attached by cutting off the bottom of the feet and gluing wooden plugs inside. Screws are driven up through the base into the plugs to hold the statuettes in place, the screw-holes in the base being counterbored to receive the screw heads. The underside of the base is covered with a piece of felt, which is glued on. The felt should project about 1½ in. beyond the vertical part of the book end; the outer book rests on this, and prevents the book end from moving. The wooden part of the book end is enameled to match the statuette, or both base and statuette may be finished in any other desirable way.—Glen McWilliams, Detroit, Mich.



Ornamental Book Ends, Made at Home, but Just as Good as Expensive Purchased Ones

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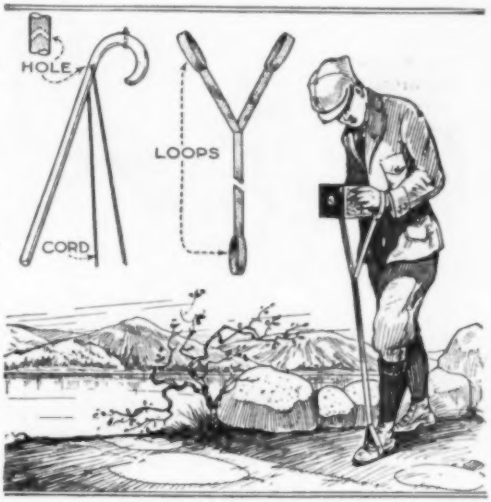
¶The Bureau of Information will tell readers where materials mentioned in the Shop Notes and Amateur Mechanics departments may be obtained.

Time Exposure with Hand Camera

Tripods are more or less of an annoyance to the camera enthusiast, and few use them. However, it is sometimes necessary to make a time exposure to get the desired picture, but the camera cannot be held steadily enough with the hands to avoid doubling the image. It is, however, a simple matter to hold the camera steady if a cane is carried along. Just below the crook of the cane two holes are drilled from opposite sides to meet in the center, both slanting down from the point of junction. Another hole is drilled through the crook to take a tripod screw, on which the camera is mounted. A cord is run through the angular hole, the ends of the cord are stepped on, and pulled taut by pulling back on the cane, which has the end planted on the ground in the position indicated, thereby holding the cane firmly in position. The arrangement thus improvised is steady enough for long-time exposures.

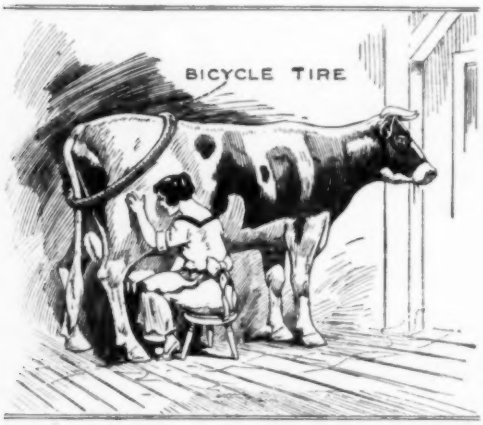


Simple Methods of Making Time Exposures without Using a Tripod

Another method of steadying the camera is to cut a length of tape into three pieces, and to tie or sew these pieces together at the central point as shown, making a form of the letter Y. Loops are made at the ends so that the foot can be placed in one loop, and each wrist in another. Then, with the camera clasped between both hands, an upward pull will enable the user to hold the camera steadily enough for a time exposure of four or five minutes.—George Parke, Chicago, Ill.

"Anchoring" the Cow's Tail

Anyone who has milked cows has suffered from the annoyance caused by the animal switching its tail around to chase

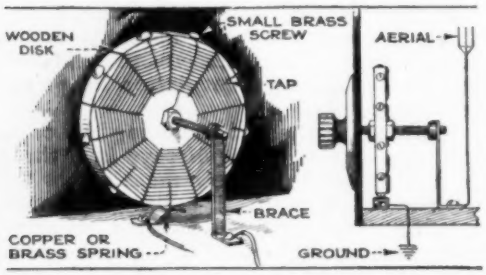


Simple and Effective Method of Preventing Cows from Switching Their Tails

away the flies. This trouble can be prevented very easily if there is an old bicycle tire lying around the yard. The tire is simply thrown over the cow's back as shown. This idea has been tried and found very effective.—F. H. Chick & Co., Strong, Me.

Novel Mounting for Spider-Web Coil

A simple and effective method of tapping a spider-web coil is shown in the drawing. The coil is wound on a wooden or fiber disk, ¼ in. thick. Each section is tapped as usual, and the taps are connected to small round-head brass screws, driven into holes, drilled and tapped in the edge of the disk. The coil is then



Rotating Spider-Web Coil That Permits the Use of a Greater Number of Taps than Usual

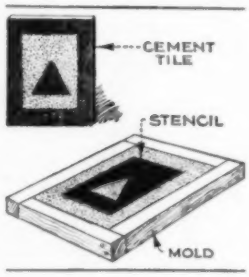
mounted on a long screw, to which is attached the knob and dial used for revolving the coil. A nut is run onto the screw, on each side of the disk, to hold it securely in place, and the end is filed down to fit a bearing made of sheet brass. The aerial end of the coil is fastened under one of the nuts, and the lead-in wire from the aerial is connected to the bearing. A flat copper or brass spring, connected to the ground, is fastened underneath the disk, so that the brass screws all come in contact with it in turn as the coil is revolved. This arrangement permits the use of a greater number of switch points than with the usual spider-web coil.—C. Wright Richell, Columbus, Ohio.

"The Kettle's Boiling"

A warning signal for a water kettle, indicating that the water is boiling, can be made from an ordinary flat tin whistle, soldered into a hole cut in the kettle lid. A little steam or vapor passing through the whistle will not cause it to sound, but when the boiling point is reached, so much steam is generated that the whistle is blown loudly. The housewife can put the kettle on and go about her work, confident that she will not forget it.—Wm. E. King, Monessen, Pa.

Ornamenting Cement Tile

Designs on the face of cement tiles, or other cement work, such as panels, can easily be made without the necessity of making wooden forms. Frequently, when wooden forms are used, and the cavities later filled with colored cement, the design appears very awkward, owing to the difficulty of forming the design in wood smoothly. The idea illustrated involves the use of a piece of a heavy waterproof-paper or sheet-metal stencil. In use the stencil is placed on the soft cement and the colored aggregate is pressed through it. A similar effect can also be obtained by dusting on dry cement color, but this is not so satisfactory, as it is not permanent. If the stencil is built up of several thicknesses of paper, a colored cement mixture can be used that will stand out in slight relief beyond the surface of the work when the stencil has been removed.



Saving Theater-Sign Lamps

Many theaters are closed for the summer months, and during this time the electric signs are not used. The lamps left on the signs accumulate dust and dirt, and some are usually broken, which gives the sign a very dilapidated appearance. To prevent this, it is advisable to remove the lamps as soon as the season is over. Removing the lamps leaves the receptacles open to catch dirt, but this can be overcome by screwing corks of the proper size into the receptacles in place of the lamps. The appearance of the corks is improved by painting them with a contrasting color.

Using a Gas Heater as a Stove

The cooking arrangement shown in the illustration has been found of considerable convenience in a room where a regular stove cannot be used, but only a gas heater is available. The device consists of a piece of russia iron, nearly as wide as the opening of the heater, with the edges bent upward as shown. Two shelf brackets are attached to the bottom to serve as legs on one side. The other side is supported by the lower part of the heater. When the gas is turned on, sufficient heat is radiated to heat water and food quickly.

Poultry Feeder and Rat Trap

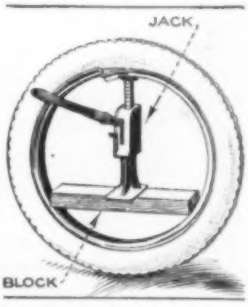
A combination rat trap and dry-mash feeder is a rather novel addition to the poultry house. The feeder is a long box, 1 ft. high and 1 ft. wide, with a sloped and slatted top, through which the hens put their heads to eat during the day. To convert this into a rat trap, a 4-in. hole was bored in the end of the hopper, a short length of 4-in. stovepipe fastened in the hole, and a bag tied over the other end of the pipe and spread out on the ground. A heavy board cover was hinged to the feed box; this was kept open by means of a hook during the day, but the hook was released, and a small prop with a string attached to it used at night. The string led away to a distant window

Combination Poultry Feeder and Rat Trap That Is Simple to Make and Very Effective

so that the poultryman could pull it without entering the poultry house and disturbing the rats. A yank at the string let the cover drop and trapped the rats inside. Then, by beating on the cover with a stick, the rats were made to run through the hole, down the pipe, and into the bag, where a few blows killed them. As long as the hens ate from the feeder the rats never seemed suspicious. —L. Harris Hiscock, Skaneateles, N. Y.

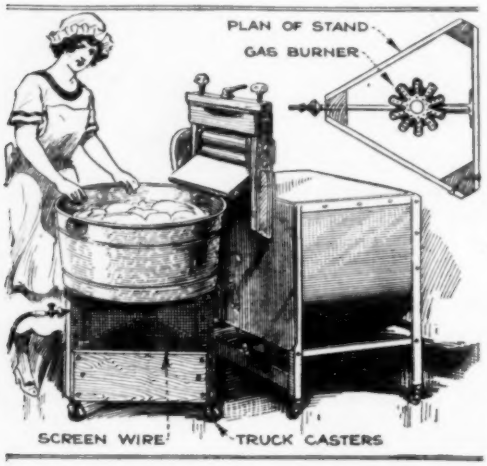
Jack Used as Rim Tool

Automobile owners and drivers generally have trouble in bringing the ends of a split rim together when replacing a tire. Various tools are made for this work, but unfortunately they are not usually carried in the car. The drawing shows a simple method of using a jack and a block of wood for spreading the rim. The pressure is exerted equally on the rim at the three points of contact, thus spreading the rim evenly and without the danger of bending it out of shape.



Handy Washtub Stand

The illustration shows a convenient washtub stand that has been found to save much heavy lifting on wash days.



Movable Tub Stand and Burner Combined That Saves Much Lifting on Wash Days

The stand is triangular in shape and has a leg at each corner, casters being provided on the legs so that the stand can easily be moved about. The legs are joined by 1 by 3-in. pieces of wood at the top, and 1 by 10-in. pieces at the bottom. The stand may be equipped with a gas burner, as shown in the upper detail. If a gas burner is provided, it should, of course, be of large size, suitable for heating a considerable quantity of water. Protection for the clothes of the user should be provided by tacking heavy screen or similar material to the sides.—Ward H. Snook, Columbus, Ohio.

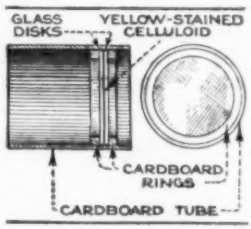
Inexpensive Emergency Gas-Tank Cap

The cap of the gasoline tank is one detachable part of the car that will loosen and become lost unless care is used to screw it tight after each filling with gasoline. One motorist discovered that the tank cap had been lost at a place where no service station could provide a replacement part. A hardware store, however, provided a good substitute cap, and one that is worth noting, in case the reader should be caught in the same predicament.

A close pipe nipple and a pipe cap, of the same pipe-thread size as the opening in the tank, which was of a standard size, provided a substitute equal, except in point of appearance, to a regular cap. A small vent hole was drilled into the cap. The cost of the two fittings approximated that of a single gallon of gasoline, and, as much gasoline waste was prevented, the improvised cap saved its cost several times over.

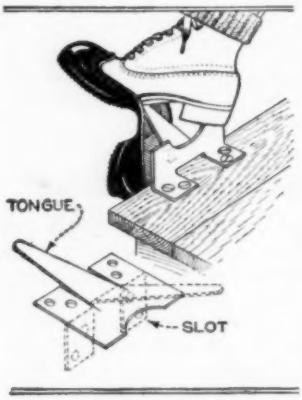
Color Screen for the Camera

The illustration shows an easily made color screen for the camera. It consists of a short length of cardboard tube that fits the lens; a cardboard ring is glued in the end of the tube at the point indicated and two circular glass disks are cut to fit the inside of the tube. These disks must be free from scratches and bubbles. Disks cut from old glass negatives are ideal for this purpose. A piece of celluloid, stained yellow, and cut to the same size as the glass disks, is placed between them. The assembly is then placed in the tube against the cardboard ring, and a second ring is glued in the tube against the other side of the assembly, to hold it in place. —Wm. J. Edmonds, Rutland, Vt.



Rubber Remover

The device illustrated has been found useful for removing tight rubbers, which are not easy or agreeable to remove with the hands when muddy. It is made of sheet metal, cut and bent to the shape indicated and screwed to the floor or the edge of a step. In using the device, the heel of the rubber is first pulled off by inserting it in the U-shaped slot and pulling the foot. The foot is then pulled back so that the tongue comes between the rubber and the sole of the shoe, after which a slight jerk of the foot will release the rubber.



TIRE REPAIRS IN THE HOME GARAGE

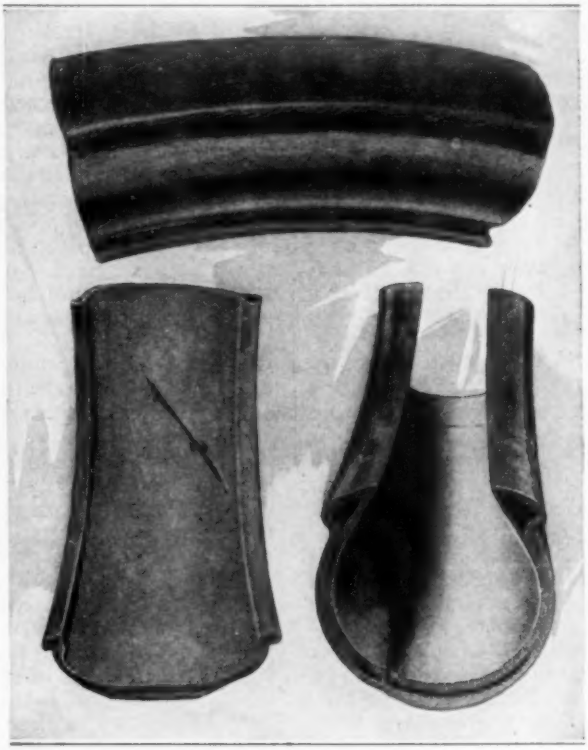
by

Lowell R. Butcher

Part I—Tire Damages and Their Prevention

THERE are but two kinds of tire damage: that caused by carelessness or inattention, and that resulting from unavoidable accidents or wear. The car owner is particularly interested in the first variety, the kind that can be prevented with proper knowledge of the causes. In addition, he will want to know what kind of tire damages can be repaired with economy, and what injuries are so severe that it is best to discard the tire in favor of a new casing.

To understand the common abuses and damages, something must be known about the parts of the tire. Each individual part of the tire has a duty to perform, and that duty cannot be done if the part is damaged or destroyed. Principal among the tire parts is the carcass. This is the framework of fabric, fabric cords, or cable cords that gives the tire its strength and serves to hold the air pressure. It is not designed to stand road wear; that function is left to the tread of the tire.



Above, Car-Track Wear; Left, Fabric Break from Stone Bruise; Right, Fabric Break Due to Running in Car Tracks

The tread of the tire is made of a compounded gum that resists wear. The rubber of this has little strength as far as retaining air pressure is concerned, but it is designed to combat wear and to protect the carcass from dirt, moisture, and direct contact with the road. The sidewall of the tire has much the same duties as the tread. It is not nearly as thick as the tread, for there should be little wear on the sidewall unless the tire is abused.

A strip of loosely woven fabric is placed between the tread and the carcass; this is known as the breaker strip, and serves to distribute the road shocks more evenly over the carcass. A cushion of rubber, known as the cushion of the tire, is placed between the breaker strip and the carcass. In some cases there is a layer of the cushion stock between the breaker and the tread as well. This cushion serves to soften the road blows so that the carcass does not take the shocks directly.

The bead of the tire simply serves to hold the tire in place on the rim. Its shape will vary with the type of rim used. The types used are two in number: the straight side and the regular clincher.

Most of the larger tires have beads to suit straight-side rims while a great many of the 30-in. tires still use the regular clincher type.

Without question, the greatest and most common abuse of tires is underinflation. With all the warnings that have been given, car owners still persist in running tires without sufficient air pressure. A multitude of damages is possible from underinflation. The carcass of the tire is constantly bent and "hinged," the gum that binds the layers of fabric or cords together is destroyed, and the plies rub together. Friction soon develops and the tire wears itself out.

It can be seen that the cushion of the tire will be put under great strain in an underinflated tire. The constant bending wears the cushion, which soon breaks down and rolls into tiny balls of rubber. Then the road shocks are taken more directly on the carcass, giving it punishing abuse. The binding gum between the tread and carcass gives way causing a condition known as a "separated" tread.

Rim cuts, as shown in Fig. 1, are a common ailment on tires that have been run soft or flat. The tire bends over the rim, which cuts the rubber of the sidewall and breaks the carcass of the tire. A blowout, which may be so severe that repair is impossible, soon follows. Other injuries of this character are due to bent or battered rims. Rusty rims will also help in making rim cuts. The rims should be straight, kept free from rust, and given frequent coats of rim paint.

The tread of the tire is often worn down through careless driving. Spinning the wheels to make a start, or in an effort to climb out of a mud hole, may grind several hundred miles from the life of the tire. Bad skids on rough pavement will wear the treads excessively, and sliding the wheels by locking the brakes will grind off the tread in patches, as shown in Fig. 2. A wobbly wheel or a bent axle will also wear the tread down unevenly, and if the front wheels are out of alinement the tread will wear off on one side. Nearly all these causes of premature tread wear can be avoided by a little care in driving.

It is often necessary to use tire chains when driving in the mud or on slippery pavements, but chains should be used no longer than absolutely necessary. A good chain, if applied correctly, will cause little wear, but an old chain or one applied incorrectly will grind the tread of the tire badly. Cheap chains should be avoided, as they are apt to be soft, and will wear rapidly, presenting innumerable sharp cutting edges to the tire; old chains also are undesirable, for the same reason. Whenever used, tire chains should be applied with enough slack to allow them to creep slightly, thus distributing the wear more evenly around the tire. Chains should always be applied with the same side next the tire, as the road side of the chains wears, and, if placed next to the tire, will cause rapid destruction. A typical example of chain damage is shown in Fig. 3.

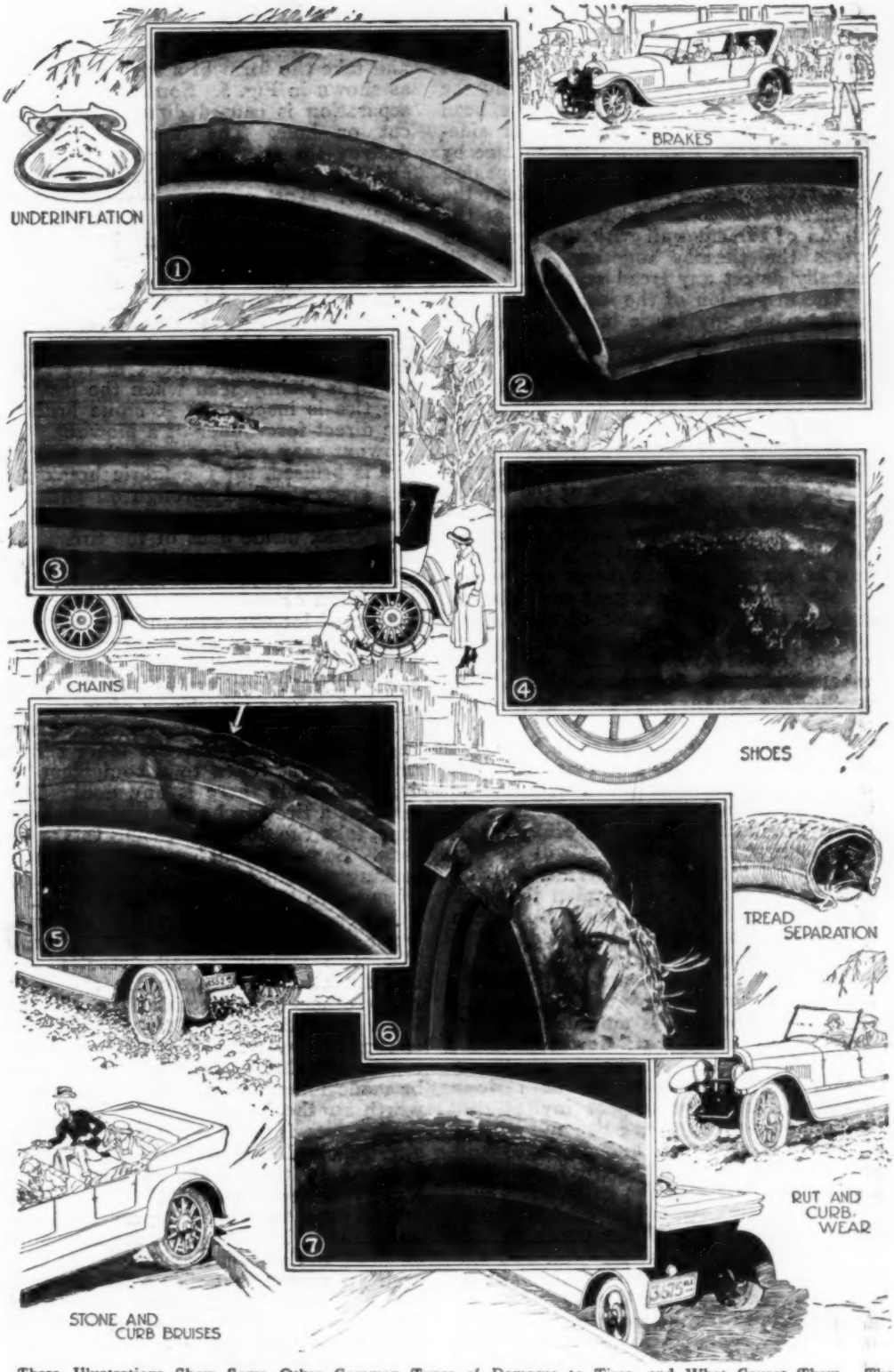
Most motorists know that grease and oil are not good for rubber, but a peep into their garages would not make one credit them with such knowledge. Tires should never be allowed to stand in grease or oil, and if a smear gets on the tire, it should be washed off with a little warm water. The rubber will rot quickly if the grease is allowed to remain.

The neglect of the tires frequently extends to the spare tire. Nearly every car nowadays is equipped with a spare tire at the rear, yet fully 50 per cent of these spares are unprotected. A tire cover is cheap insurance against the effects of heat, sun, and moisture. Most of the life of a tire may be destroyed by carrying it as a spare without any protection.

Loose inside shoes are another cause of tire damage, often unsuspected. Shoes must be used in emergencies, of course, but they should not be kept in the casing any longer than necessary, and, if they must be used, they should be cemented in place. A loose shoe will shift slightly, and will rub or chafe the fabric as it shifts, until the inside of the casing presents the appearance shown in Fig. 4. Aside from the liability of chafing, the shifting shoe may pinch or injure the inner tube.

To get the most out of his tires, every car owner should inspect them at frequent intervals. Many small damages, if found in time, may be repaired at a small cost, but their neglect may mean a more costly repair, or a damage that makes the tire worthless. Many of the small repairs may be made at home if the motorist finds the injury in time.

In going over the tires for damages, some systematic method should be followed. Hit-and-miss methods will not do, as one may pass up several injuries that a more methodical examination will disclose. Possibly the inspection is best started at the inside of the tire. Open the tire and prop the beads apart with short sticks, so that the inside of the tire is brought into plain view. Go over the



These Illustrations Show Some Other Common Types of Damages to Tires, and What Causes Them. The Best and Costliest Tires will Not Give the Service Expected of Them If Neglected

inside of the tire carefully, feeling for fabric breaks or chafed spots. Bend the outside of the tire just above the bead channel, opening any rim cuts or sidewall damages. Flex the tread surface by pressing the tire together and opening any tread cuts. Place one thumb at the center of the tread and the other at the union of the sidewall with the tread and press the thumbs together. This will usually detect any tread separation.

The inspection of the inside of the tire will disclose any fabric breaks or chafes. A good light is essential in making the inside examination, as the inside of a tire is covered with a light layer of gum and a coat of tire paint, and small cracks in the fabric may escape detection if the inspection is not carefully made.

A good sense of touch is necessary in finding any separated plies of the fabric. If the plies are separated, the friction—the light layer of gum between them—will be rolled up into tiny balls. These can be felt between the layers of the carcass by running the fingers over the inside of the tire. Neglect of this injury usually results in a blowout, as the plies of the carcass rub together and wear themselves out. Separated plies of the carcass are usually the result of running a tire soft or flat.

The bending of the sidewall near the bead will open up any rim cuts. The rim cuts in a clincher tire will be close to the bead channel and may pass unnoticed if the examination is not carefully made. Those on straight-side tires will be farther up on the sidewall. While looking for rim cuts, it is a good plan to check over the condition of the bead. A broken bead core or a chafed bead cover are the two most common bead damages.

Cuts on the tread can be found by bending, although they may not be noticed when the tire is mounted and inflated. Any tread cut, however small, should be repaired at once. In themselves, tread cuts may not be serious damages, but their neglect invites dirt and moisture to enter the tire and rot the carcass. Severe cuts and damages will often extend through the tread and open one or more plies of the carcass.

Tread separations are most often found at the hinge point of the tire. This is the point at which the sidewall and the tread meet. As explained, this damage can be detected by pressing together the hinge section with the thumbs. In aggravated cases, where sand and dirt have been allowed to enter through a small cut or hole, the separation may bulge out and take the form of a sand blister, such as shown in Fig. 5. Sometimes the tread separation is caused directly by a small cut or hole. The dirt and moisture destroy the friction between the carcass and the tread, causing the separation to appear. Most often, however, tread separation is caused by underinflation.

Stone bruises, caused by bumping against curbs, or striking heavy stones in the road at high speed, are often hard to find. Usually they can be found at points in the carcass that seem to have lost their "life." More serious cases manifest themselves in a break in the fabric, which is plainly seen when the inside of the tire is inspected. A stone bruise is the direct forerunner of a blowout. The blowout may not occur at the time the tire is bruised, for the fabric break does not always extend through all plies, but pinched tubes often result from bruises that break inside plies of the tire.

The frequent inspection of the tires will help to get the most from them. This inspection or examination may be of the nature of looking over the tire for tread cuts or may be an elaborate examination of both the inside and the outside of the tire. The inspection should be made once every two months or oftener.

Many of the minor tire damages can be repaired at home, but the more serious ones are best taken to a competent tire repairman. If there is any doubt as to whether a tire can be repaired with economy, take the doubtful casing to the tire man. Sometimes a few dollars spent in making a small repair will add thousands of miles to the life of the tire.

In general, a tire with a badly separated tread cannot be repaired with economy. This tire ailment usually results from underinflation, and there are apt to be many other things besides the tread at fault. Sometimes a badly separated tread is repaired by retreading the tire. This repair is rather costly and should never be made unless the carcass of the tire is worth another tread.

Blowouts from stone bruises are usually repaired. Sometimes this damage happens to tires that are almost new. However, the permanent repair should not be postponed by using an emergency inside boot. If this is done for any length of time, the casing may be damaged to such an extent that its repair is doubtful economy. There have been many tires ruined by using blowout boots for some time after the blowout has happened. One such tire is shown in Fig. 6; the carcass was rotted by the dirt and

moisture which had easy access to the inside of the tire.

Rim cuts are hard to repair. In many cases this damage extends around the entire tire, and, when such is the case, no attempt should be made to repair it. To repair it properly would mean considerable expense, and after the job was done it is doubtful if the repair would hold. A short rim cut, however, can be repaired effectively.

Nail holes and small cuts are easily repaired at home, and they should not be neglected, as ignoring them may mean a serious damage later on.

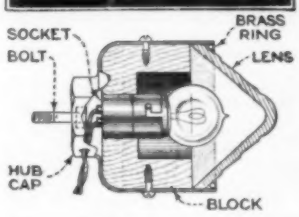
The sidewalls of the tire are not as frequently injured as some other parts, but they can be almost destroyed by careless driving. Running in deep ruts or in street-car tracks will impose a great deal of wear on this part of the tire, which is not built for it. Very often the tire sidewalls are scuffed and bruised, as in Fig. 7, by attempting to place the car too close to the curb when parking. The remedy for these troubles is obvious—keep out of ruts and street-car tracks, and don't allow the tires to scrape against the curb.

Careful inspection of tires followed by the necessary repairs means dollars saved for the car owner. Many of the minor injuries can be repaired at home; in fact, if the tires are cared for as they should be, trips to the tire man will be few and far between. It is the neglect of tires that causes the more important and serious damages. Much of the dissatisfaction toward the service the car owner gets from his tires will be done away with if he will take care of his tires as he should. Repair the little damages before they become big ones and the tire mileage will correspondingly increase.

The next article will describe the repair of tire casings.

Homemade Side and Tail Lamps

Electric side and tail lamps for use on a light car can be constructed from nickeled hub caps, and will look just as neat as the manufactured ones. A block of wood, cut to fit inside of the hub cap, is drilled to take a standard automobile-lamp socket, then counterbored for the lamp. The block is inserted into the hub cap in the position shown, and fastened in place by means of small wood screws, driven in from the outside. The lens is held between the block and a brass ring, which is soldered at two points to the inside of the hub cap. Another method of holding the lens in place is to insert a single coil of spring wire inside the hub cap, so that it will spring outward against the cap when released, in the same manner as a common tail-lamp lens is locked, the threads keeping the wire from slipping out. A small hole is punched in the end of the cap to receive a bolt for fastening the lamp.



Appropriate Camp Ash Tray

In harmony with the atmosphere of the camp and forests is the ash tray shown in the photograph, which is made to represent a black bear, standing erect with its paw in the crotch of a small maple branch that supports the ash tray at a convenient height. The bear figure is cut from a very thin hemlock board with a jig saw, and appropriately finished in glossy black paint, with a bit of buff on the muzzle.

Segregating Nonproductive Hens

In order to pick out nonproductive hens, we placed a piece of woolen cloth, saturated with glycerin and colored with a dye, above the entrance of each nest, so that the hens would strike against it when entering the nest. The result was that the laying hens bore marks on their heads, backs, or tails, while the nonproductive ones remained unmarked. After a second and third test the latter were segregated.—Abe Sair, Brandon, Can.

Skirt Used as Grass Bag

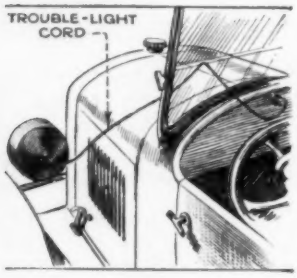
An old wide dress skirt, with the belt cut off, and the bottom stitched across, makes an excellent bag for carrying lawn

Large Bag Made from an Old Dress Skirt, and Used for Carrying Grass and Leaves Raked from the Lawn

rakings. Several bushels of mown grass can be carried in it conveniently, as it is short and wide, and does not weigh as much as a basket.

Emergency Headlights

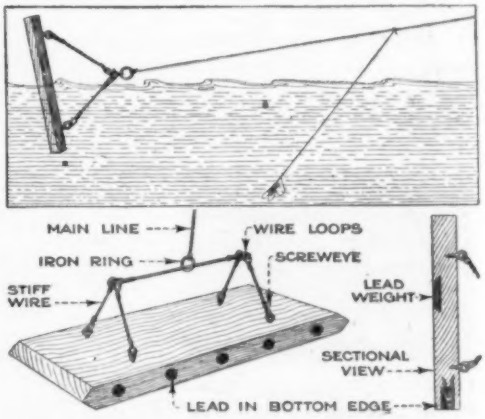
When the headlights of an automobile are "out of commission," owing to a ground or a short, one or both of them can still be used, providing there is a trouble lamp in the car. The trouble-cord lamp socket is removed, and the wires attached to the headlight plug, replacing the usual wires. The cord is then run from the dash-lamp socket to one of the headlights, as shown, or better still, by means of an extra length of cord, it can be connected to both headlamps, in parallel. It is a good idea to be prepared to meet emergencies of this nature by carrying an extra trouble cord, fitted with a plug at each end.



Fishing in Center of Swift River

How to fish a rushing river in midstream successfully has been a mystery to many who have wanted to try their luck in the far-out pools, which are difficult, if not impossible, to reach from shore. For such fishing, the board or trolling guide shown serves excellently.

The device is made from light pine and is 1½ ft. long, 6 in. wide, and ¾ in. thick. Both ends are pointed, as shown, the better to cut the water. Four screw-eyes are driven into one side of the board, and wires that are stiff enough to prevent bending easily are attached to the eyes, as shown, by making a ring or eye at the ends. A horizontal wire with an eye at each end is run between the end wires and is attached to eyes made in the outer ends of the first wires. The line that runs to the boat or fisherman's rod has a ring fastened to it that slides freely along the crosswire. The line with the lure on it is connected to the main line, and with it one can reach the deep spots that cannot otherwise be successfully fished. To make the block ride the water properly the bottom edge must be ballasted with lead.



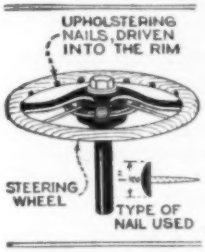
Fishing Block or Trolling Guide for Fishing in the Middle of a Swift Channel

Holes are drilled into the edge of the board with an auger bit, a staple or nail driven into the center of each hole, and melted lead is poured in. Enough holes are made and filled in this manner so that the block will be pulled down in the water to a depth of 3 inches. Also, as there is a pull on the line side this must be balanced by weighing down the opposite side, which can be done by cutting a dovetailed groove along the back of the board, and filling it with melted

lead, or by fastening a weight to the board, above the center. This will make the device swim at the proper angle, so that when there is a pull on the line, the device will not turn over toward the line side.—Robt. Page Lincoln, Minneapolis, Minn.

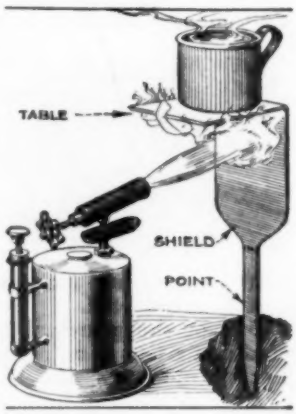
Upholstery Nails Improve Steering Wheel

The steering wheel of a light car, which has straight pinion gearing from the wheel to the steering knuckle, is deflected very easily by stones and ruts on the road, so that it is necessary to grip the wheel firmly on rough roads. To prevent the wheel from slipping in the hand, due to its smooth surface, ordinary round-head upholstery nails should be driven into the steering wheel on the inside. The nails used for this purpose have a large fiber head, about ½ in. in diameter.



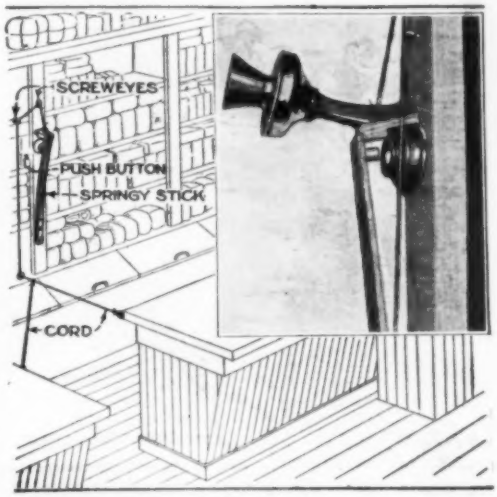
Cooking Lunch with a Blowtorch

The writer once worked at steam fitting and learned, among other things, a handy way to heat a lunch with a blowtorch. A piece of flat steel is cut to form a portion, 4 in. wide and 7 in. long, which narrows down to a section, about ¼ in. wide and 5 in. long, tapering to a sharp point. The wide portion is bent at right angles 4 in. from the end, and forms a table 4 in. square. The narrow part is stuck into the ground or floor when used, and a blowtorch is placed in the position indicated, with the flame directed under the table. A lunch can be heated in a surprisingly short time in this manner.—L. B. Robbins, Harwich, Massachusetts.



Simple and Effective Burglar Alarm

A village storekeeper, who did not wish to become a victim of robbery, of which a number had occurred in his vicinity,



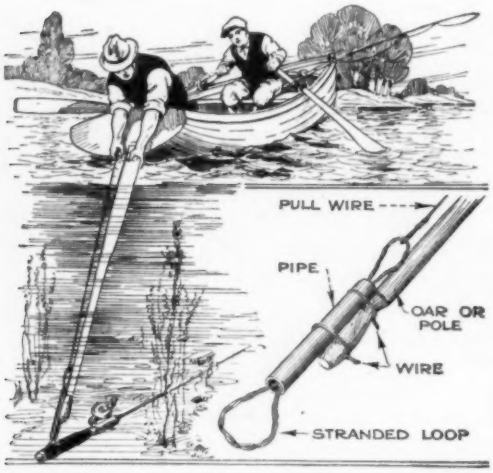
Simple Burglar Alarm Improvised by a Country Storekeeper: It Actually Aided in Catching a Burglar

improvised the simple burglar alarm shown in the photograph, and, with its use, succeeded in capturing one of the night marauders.

The alarm consists of a trip arrangement, which, when released, presses the telephone push-button switch, thereby ringing the call bell at the telephone exchange. The operator then notifies the sheriff, the owner of the store, and other interested parties. The trip is merely a springy stick, with the lower end securely screwed to the wall below the button, the upper end being loose and fitted with a short peg. The push-button switch is located directly under the peg, as shown, so that the button will be pushed down when the stick is released. A short piece of wood is set between the edge of the stick and the wall, and is connected to a long stout cord, passed through a few screweyes, and stretched in the position most likely to be passed by one attempting burglary. When this cord is pulled the piece of wood is dislodged and the peg presses the push button, which rings the bell at the telephone office continuously until a switch is released by the operator. As no alarm is sounded within the store, the intruder is unaware that he has "given himself away"—until the arrival of the officers. This idea can only be used, of course, where a push-button ringer is used on the telephone.

Salvaging Submerged Objects

While idling along close to shore in a rowboat one day the writer happened to "spot" an object lying in the mud about



A Handy Device for Salvaging Objects Submerged in Shallow Water

7 ft. under water. After ascertaining that this was a steel fishing rod, preparations were made to salvage it. Several attempts to hook it with a large fishhook proved futile, so in the end the writer had to don a bathing suit and go after it. This little incident suggested a better method of salvaging submerged objects, which was later tried out and found successful.

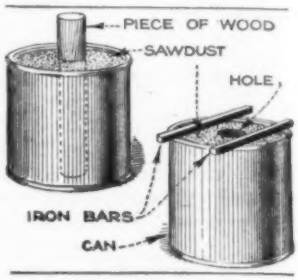
A piece of pipe about a foot long, and a length of hay-baling wire, were picked up around the barn. The wire was doubled and twisted to make it stiffer, then formed into a loop and inserted in the pipe so that it projected out of both ends as shown. These parts, and a coil of the baling wire, were kept in the bottom of the boat, to be assembled as shown in the sketch when an object worth salvaging was located.

When using the device, the length of pipe is wired to the handle of an oar, with the wire loop inside, and the lower end of the loop projecting enough so that it can be passed over the object to be salvaged. A wire attached to the upper end of the loop and running up to the user is then pulled, so that the loop holds the object securely. By lifting the oar the object is easily brought to the surface.

When trying to ascertain the nature of a submerged object, a powerful flashlight is of aid.—C. M. Wilcox, Torrington, Conn.

A Cheap Glue-Pot Heater

A small tin can filled with sawdust makes a glue-pot heater that will keep the glue hot all day; a ½-gal. can is large enough. Set a round piece of wood vertically in the center of the can and fill the space around it with sawdust. Then remove the piece of wood and drop a lighted match into the hole; this will cause the sawdust to start burning, giving heat enough to keep the glue soft. Two short iron bars are placed on top of the heater to provide an air space between it and the glue pot.



Back-Yard "Hen Pastures"

Green feed is necessary to the health and productivity of hens, and the farmyard has no end of green things, bugs, worms, seeds, and grit, which may be had for a little desultory hunting. The commercial poultryman also takes special pains to supply free range if possible, or provides some kind of green feed in sufficient quantities to keep the birds flourishing, but the back-yard hen frequently has a hard time of it, and the owner often decides that there is something wrong with the breed or with the grain combination, when there is nothing more the matter than lack of green feed.

One of the principal things this back-yard hen needs is a "magic green carpet." That carpet, says the U. S. Department of Agriculture, can be made of oats grown in a small part of the yard. Instead of putting a fence around this tiny field to keep the fowl from destroying it before it has a chance to develop, some fine-mesh fencing wire is placed over it, the wire being tacked to a frame made from pieces of 2 by 4-in. wood. The oats will grow up through the mesh where the hens can pick them off, but they will be unable to reach in far enough to do any

serious damage to the plants. Such a patch of oats, if watered regularly, will last for a long time. The hens will walk over the wire and graze off the tops, but if the wire has been stretched tightly it will not sag down far enough to permit the hens to reach the ground.

"Solo" Batting Practice

The young baseball enthusiast often finds himself handicapped in batting practice because there is no one to pitch the ball. The device shown, while hardly taking the place of a pitcher, nevertheless affords the batter considerable practice.

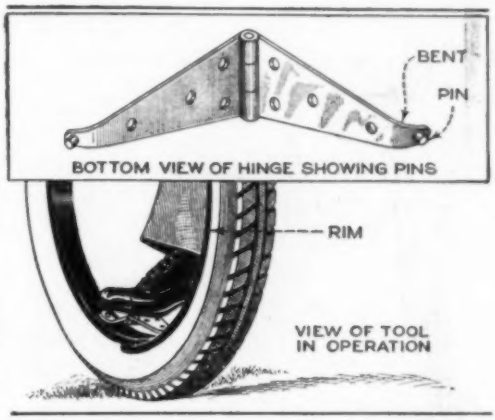
On the top of a post, 12 ft. high, a bicycle wheel is mounted. A stout cord or light rope, about 10 ft. long, is tied to the rim, and a baseball is attached to the lower end by means of a screweye. The batter gives the ball a swing and the momentum carries it around the post, causing the bicycle wheel to rotate in the same direction. When the ball crosses

Mechanical Baseball Pitcher That Provides Continual Batting Practice When No Pitcher Is Present

the imaginary plate, the batter strikes it, sending it in the opposite direction. If the hit has been square, the ball will make several revolutions before it has dropped far enough to enable the batter to strike it again. The batter strikes first in one direction and then in the other, which, with practice, will enable the player to use either hand.—Dale R. Van Horn, Walton, Neb.

Rim Spreader for Changing Tires

A common 8-in. barn-door hinge can be used to good advantage for spreading automobile rims when changing tires. If

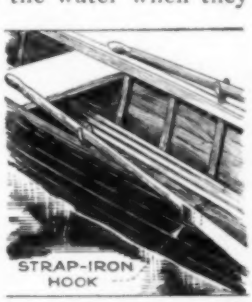


An Effective Automobile-Rim Spreader Made from a Barn-Door Hinge

the rims are perfectly plain at the split it will be necessary to drill two 5/16-in. holes about 4 in. from the ends. Two pins are riveted or welded to the end of the hinge and each end is then bent as shown. The pins are inserted into the holes drilled in the rim and the hinge is pushed down with the foot, thus spreading the rim. If there are studs on the rim, the hinge can be used without pins, by simply butting the ends against the studs, notching the ends if necessary to prevent the hinge from slipping.—Frank N. Coakley, Buffalo, N. Y.

Hanger for Oars

Boats are usually not provided with means for keeping the oars outside of the boat and above the water when they are not in use, and this necessitates lifting the oars into the boat, with the result that the seats are bespattered with water from the wet blades. To overcome this, simple hangers of the kind shown in the illustration can easily be made from short lengths of strap iron, bent as indicated and fastened firmly to the gunwales by long screws.



Seat on Cripple's Crutch

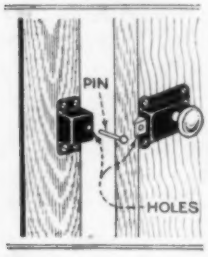
A cripple, one of whose legs is amputated above the knee, uses a crutch to which a support of the type illustrated is

Convenient Crutch Seat or Support That Lessens the Pressure of the Crutch under the Arm

attached. The seat is located at the point most convenient for the user, and takes part of his weight, thus relieving the pressure of the crutch under the arm. It may also be used as shown in the drawing. The support is made of ¾ or 1-in. wood, comfortably padded on top, and braced by means of ¼-in. iron rods, flattened at each end, drilled, and bolted to support and crutch.—A. C. Cole, Chicago, Illinois.

Making a Lock Jimmy-Proof

An ordinary door lock can be made jimmy-proof by drilling a 5/16 or ¼-in. hole through the lock casing, the end of the bolt, and the door casing, as shown in the drawing, so that a nail or a pin can be pushed in. When the door is locked and the pin pushed into place, it will be a hard matter for anyone to jimmy the door from the outside. This idea has been tried and found thoroughly practical.—L. E. Fetter, Portsmouth, N. H.



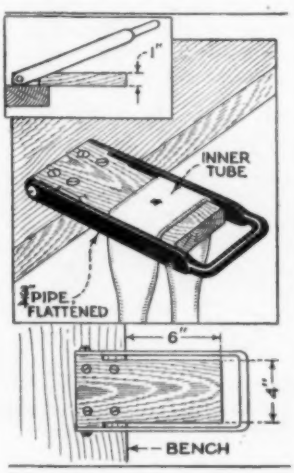
Homemade Radio Dials

Substantial radio dials of neat appearance can be cut from old rubber storage-battery jars. To facilitate cutting, the rubber is softened by heat. After the dial, cut roughly to shape, has hardened, which can be hastened by immersing it in cold water, it is trimmed down and beveled upon a lathe. If a lathe is not available, one can easily be improvised by mounting the dial concentrically on any wheel that can be revolved at a speed sufficient for cutting. A sharp chisel is then used in the ordinary way.

To graduate the dial, it is again heated, to enable neat impressions to be stamped upon it. The lines are pressed in with a knife edge, and the numbers with type obtained from a printing shop. After the impressions have been made, and the dial has cooled off, white paint is dabbed over the impressions. The dial is then carefully rubbed with a dry cloth, so that all the paint but that in the graduations and numbers is removed.

Simple Holder Makes Inner-Tube Repairing Easy

The fixture shown in the illustration is very convenient for holding inner tubes securely while making repairs. It consists of a length of ¾-in. pipe, bent and flattened as shown, and drilled at each end to receive the wood screws with which it is pivoted to one end of a 9-in. length of 1 by 4-in. wood. The base is screwed down to the bench securely, so that it projects about 6 in. over the edge, as indicated. In use, the tube to be repaired is placed in the position shown, and the pipe is pulled down, flattening the tube and holding it securely while the surface is cleaned and the patch applied. A space is left between the sides of the pipe and the base, so that the tube will not be chafed.

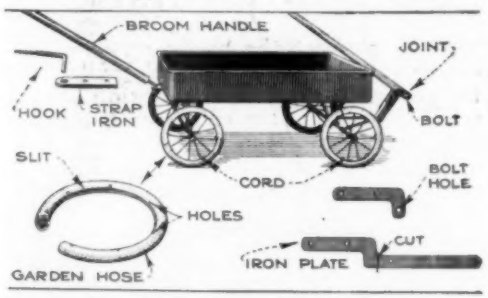


Reconstructing a Small Wagon

An ordinary coaster wagon with flat steel-rimmed wheels was rubber-tired with lengths of ordinary garden hose, split open on the inside with a knife and stretched around the wheels as shown. A few holes were punched along the edges of the slit to permit the hose to be laced to the rim with shoestrings. The lengths of hose were made to fit together snugly at the ends.

The handle of the wagon was also changed to make it easier for the rider to steer. The tongue was cut near the end attached to the axle, and two iron plates, which, in this case, were taken from the legs of an old army cot, were attached so that the upper end of the tongue could be swung back over the cart. It is not essential to have the plates of the shape shown; straight pieces will do just as well if a little space is left between the cut ends of the tongue.

To make it an easy task for an older person to push the small cart, a short piece of strap iron, with a hole drilled in the end, was attached to the rear end of the cart as shown. A screwhook, screwed into the end of a broom handle, was hooked into the hole of the strip of strap iron, and the handle used to push the cart; this allows the rider to steer,



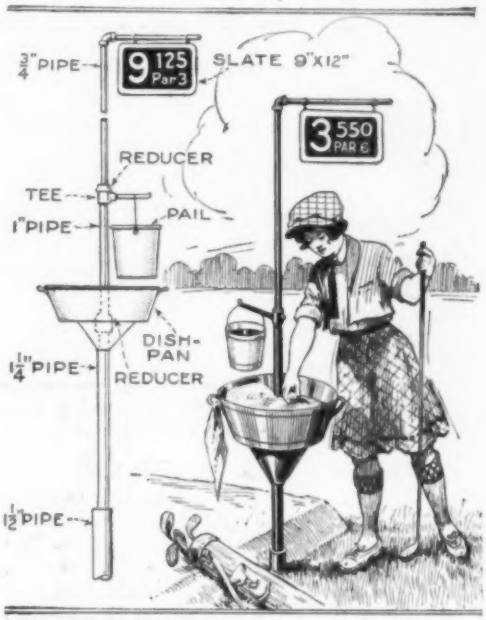
In Reconstructing a Small Cart, the Wheels were Rubber-Tired with Lengths of Ordinary Garden Hose

while giving the "motive power" complete control of the wagon at street crossings.—Mrs. Ruth D. Shultis, Albion, Michigan.

Portable Sand Stand for Golf Course

The drawing shows a portable homemade sand stand for the golf course. It can be made for a small sum in comparison with that asked for similar manufactured stands, and it gives just as much satisfaction.

The sand box is made from a 16-in. dishpan, and the upright parts from lengths of ordinary galvanized-iron pipe and fittings. The base is a 2-ft. length



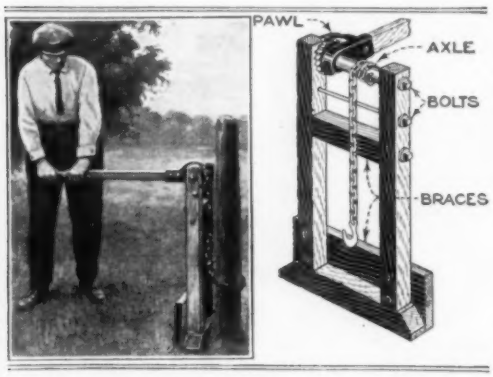
Homemade Sand Stand for the Golf Course That Is Just as Satisfactory as a Manufactured One

of 1½-in. pipe, driven into the ground. The stand is simply set into the base. The lower length of pipe, which is 1¼ in. in size, is 4 ft. long, and a reducer is screwed onto the upper end. On the shoulder of the reducer the dishpan is placed, a hole being, of course, cut in the bottom of the dishpan, and part of a funnel is soldered to it, as shown; the funnel prevents the pan from tipping, but allows it to be rotated if desired. The 1-in. pipe above the reducing nipple is about 18 in. long. A reducing tee is fitted on this, a 1-ft. length of ¾-in. pipe, notched to hold the water pail, is screwed into the tee horizontally, and a 3-ft. length vertically. An elbow is screwed onto the top, and a 1-ft. length of pipe is extended as a support for a sign, giving the number of the hole on one side, and ground rules relative to the individual hole on the other side. Ordinary school slates, with screweyes driven into the edge, have proved satisfactory as signs.

During the winter these stands are taken from the golf course, painted, and stored away. A seamless dishpan is used, the handles being left on to provide places to attach a towel.—Dr. Frank B. Swartzlander, Doylestown, Pa.

A Ratchet Post Puller

The ratchet post puller illustrated is operated by means of an ordinary pump

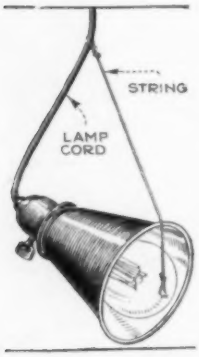


A Ratchet Post Puller will Pull Almost Any Post, Due to the Leverage Obtained

handle. The ratchet wheel is shrunk on an axle which is mounted in the vertical members of a strong wooden frame as shown. The pawl that engages with the ratchet wheel is attached to the handle, which pivots on the axle as indicated, and a strong chain, with a hook on one end, is securely pinned to the shaft. In use, the chain is hooked around the post to be pulled, and the handle is operated like a pump.

Simple Droplight Shade Adjuster

An ordinary droplight, fitted with a shade, is often used above desks and drawing boards, but when the light is adjusted high enough to enable one to work under it, it is impossible to keep it from shining directly in the eyes without using an eyeshade, which some people dislike to wear. The trouble can, however, be prevented by adjusting the lamp so that the light is not thrown directly downward. This is done by means of a string, tied around the lamp cord above the shade, and looped over the point of the lamp as shown in the drawing. Obviously, the shade can be set at any angle to suit the user, so that the direct light is cut off from the eyes.—C. L. Hendrickson, Milwaukee, Wis.

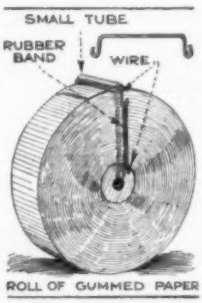


Replacing an Auto Engine

In replacing an engine of a light car, it is sometimes difficult to slip the rear end of the engine into position without displacing the gasket on the front half of the universal case. If a jack is set against the rear end of one running board and against a block on the rear hub, the torque tube can be shoved back, and the universal case and gasket can be pushed or tapped far enough back to slip in easily.—A. O. Bosshard, East Moline, Illinois.

Preventing Gummed Tape from Unrolling

To prevent a large roll of gummed tape from unrolling, a simple attachment of the kind shown has been found effective.



A small aluminum tube, used for holding extra leads for a metal pencil, was used, and two wire paper clips, straightened to form hooks of the kind illustrated. One of these was run through the center of the roll of tape and the other through the tube. Two short rubber bands were then used to connect the hooks on each side of the roll. When the tape is pulled, the tube rolls back, but the tension of the rubbers prevents the roll from loosening.

Extension for Wrench

Every tractor or other piece of farm machinery has some nuts in locations that are difficult to reach; this necessitates the use of some extension on the wrench when these nuts must be loosened or tightened. A good extension for this purpose is shown in the drawing. It consists of a steel bar, with a slot at one end to fit the wrench head, and having a rivet or pin driven through the slot. With this extension wrench it is possible to grip a nut from the top or side as indicated, in whatever way is most convenient.—G. G. McVicker, North Bend, Neb.

PRIZE OFFERS AND ANNOUNCEMENTS

PRIZE OFFERED FOR WORLD-PEACE PLAN OPEN TO EVERY AMERICAN

One hundred thousand dollars is offered by Edward W. Bok, of Philadelphia, as a prize for "the most practicable plan by which the United States may cooperate with other nations to achieve and preserve world peace." The prize, which is to be called the American Peace Award, is open to "every American," and according to preliminary announcements, the "plans will have to be in probably not later than the middle of November, next." The exact conditions will, however, not be made public for some time. A jury of award, whose membership has not yet been selected, will judge the plans, and the prize will be given in two parts, viz., $50,000 for the plan itself, and $50,000 after the practicability of the idea has been demonstrated, "either through its adoption by the United States Senate, or by a sufficient popular endorsement of it."

ESSAYS ON PLUMBING AWARDED PRIZES BY CARNEGIE TECHNICAL INSTITUTE

Recent announcements from the Carnegie Institute of Technology, at Pittsburgh, Pa., state that the award of two prizes donated by the Eastern Clay Products Company, of $100 and $50, respectively, has taken place. The subject of the prize competition was the "Use of Vitrified Clay Pipe in Plumbing Systems," the contest was nation-wide, and the quality of the papers submitted, exceptionally high. The first-prize winner is a student of the institute, and a master plumber won the second prize.

TEN THOUSAND DOLLARS FOR ONE WORD ACCEPTABLE AS MOVIE-PLAY TITLE

Ten thousand dollars for a word, $20,000 for two words, and $25,000 for a three-word combination that can be used as a title for a movie play will be paid by a producing company in the West. The word must be a motion-picture title that will earn more than $10,000 for the company producing a picture with that title, it is announced. As many titles as have promise and prove available will be bought and it is believed the number of good titles to be submitted will be too few rather than too numerous.

PAY TEN DOLLARS FOR HARDWARE IDEAS OF VALUE TO OWNERS AND CLERKS

Ideas for hardware men are wanted by the editor of a trade magazine who will pay $10 for the best one received each month and $2 for all others accepted. Short letters on how deliveries are handled, unique window displays, how trade is increased, or anything else of particular interest to hardware clerks and merchants are asked.

OFFER PRIZE FOR NAME FOR NEW TRAIN RUNNING NORTH FROM NEW ORLEANS

The person who suggests a name for a new train passing between Washington, D. C., and New Orleans will receive $200 from the operating company, if the name is accepted. There will be through sleeping-car service between New Orleans, Montgomery, Atlanta, Washington, Philadelphia, and New York City, it is announced.

RADIO MEN TO GET $5,000 A YEAR FROM UNITED STATES GOVERNMENT

One hundred dollars a week is the highest salary offered radio engineers who take a test with the U. S. Civil Service Commission to fill vacancies now existing. Positions paying from $2,000 to $5,000 yearly are to be filled by examinations, applications for which close October 30. The duties are to superintend development of apparatus for land stations, airplanes, ships, and perform similar lines of work. Competitors will not be required to report for examination at any place but will be judged on education, experience, and general training.

GOVERNMENT SEEKS JUNIOR ENGINEER FOR BRANCH OF GEOLOGICAL SURVEY

To fill a vacancy in the water resources branch of the U. S. Geological Survey the U. S. Civil Service Commission will select a junior engineer from applications received before September 25. The entrance salary is $1,620 a year, plus the increase of $20 a month granted by Congress. The field of activity may be in any part of the United States.

GIVE $5,000 IN PRIZES FOR BEST RADIO STORE WINDOWS

Five thousand dollars in prizes are offered radio dealers who prepare the best window displays showing Cunningham vacuum tubes, from September 24 to October 1.

CONTESTS PREVIOUSLY ANNOUNCED

Medals, Diplomas, and Money Awards: Announced August issue, 1921; awards offered by the Franklin Institute. The Franklin medal is for workers in technology; the Elliott-Cresson is for original research work and invention; the Howard N. Potts is for important development of previous discoveries and inventions. Each award consists of a gold medal with a diploma. There are also a silver medal, and a Certificate of Merit awarded for meritorious discoveries, and cash premiums for certain work in optics.

Best Treatise Regarding Immortality: Prize $1,000; announced January issue, 1923; closes Dec. 1, 1923.

Awards to Further Science of Electricity: Medals and prizes, amounting in all to about $20,000; announced February issue, 1923.

For Best Work by American Chemist: An annual award of $25,000; announced February issue, 1923.

Names for Great Lakes Steamers: Two prizes of $50 each; announced February issue, 1923; suggested names must be submitted before the opening of navigation season in 1924.

Essay on Economic Subject: Prize $1,500; announced March issue, 1923.

Pulitzer Prizes, Columbia University: For best work in various literary and journalistic lines; announced April issue, 1923; nominations of candidates must be made before Feb. 1, 1924.

Scholarships for War Nurses and Ex-Service Men: Numerous scholarships provided at colleges and universities throughout the country under the will of the late La Verne Noyes; announced April issue, 1923.

Most Practicable Device for Recording Mine-Shaft Signals: Prize of £250, or about $1,100; announced May issue, 1923.

Prizes for Essays: Three yearly prizes of $2,500, $300, and $200; announced June issue, 1923; for articles on subjects relating to business development and the modern trust company; closes August 31, each year.

Boys' and Girls' Short-Story Contest: Two first awards of $100, and other prizes; announced May issue, 1923.

Greatest Benefit to Community Rendered by Women's Club: Prize, $1,000; announced May issue, 1923.

Endurance Prize for Aerial Engine: Prize, 1,000,000 francs (normally about $200,000); announced June issue, 1923; applications for privilege to compete should be in before Dec. 1, 1923.

Device for Recording Shaft Signals: Prize, £250; announced May issue, 1923.

Prizes for Essays on Purchasing Power: Three prizes of $1,500, $800, and $500; announced June issue, 1923.

Our Bureau of Information will furnish addresses and further details

Students' Essays on Municipal Government: Prizes $250 and $100 for postgraduates; $100 for undergraduates; announced May issue, 1923.

Prize Offered by New York Academy of Science: The A. Cressy Morrison Prize for 1923, for paper on any subject covered by the academy; announced August issue, 1923; papers must be submitted on or before Nov. 1, 1923.

Preventive of "Klieg Eyes": Award of $50,000; announced August issue, 1923.

Electric Storage-Battery Mine Locomotive: Prize, £1,000; announced August issue, 1923. Working trials of machines selected will be announced later.

Vertical Airplane Flights: Prizes aggregating £50,000; announced August issue, 1923; entries must be received before April 30, 1924.

SCIENCE NOTES FOR DAILY USE

MODERN LIGHTS, RIVALING SUN, STUDIED TO AVOID HARM TO EYES

Cave dwellers of 50,000 years ago, lighting their ways with firebrands, suffered little from eye troubles, according to experts studying ways to prevent the strong glare of modern lighting systems, that are so injurious to the eyes of those working and living under their rays. When candles and oil wicks were replaced by bright gas lamps and electric bulbs, no great efforts were made to care for the increased brilliancy. This resulted in poor distribution of light, and had the same effect as looking into the sun on a bright day. Attention is to be turned to factory and school lighting for the purpose of devising rules by which such illumination will be governed.

AUTOMOBILE RIDING INCREASES LIFE AN AVERAGE OF ELEVEN YEARS

Figures compiled recently by three physicians indicate that the universal adoption of the automobile as a means of individual transportation has added 11 years to the average life of an American citizen. In 1903, when only 10,850 cars were made, the average length of life was placed at 37.64 years. Ten years later, when the production of autos had increased to 461,500, the life expectancy had advanced to 41.01 years. In 1922, when 2,287,000 automobiles were turned out by the factories, the average life had increased to 48.66 years. Sunshine, open air and freedom from worry that results from driving on the open road, the doctors stated, caused the noticeable lengthening of life in the last twenty years.

COAL FACTS

ONE pound will pull one ton of freight 16 miles.

For each scoop of coal one full passenger fare for one mile is required to pay for it.

Combined revenue from a train in which one passenger is riding in each coach will not pay for the coal required to pull them.

There are more than 225 commercial articles extracted from coal.

It takes 150 cubic feet of air to burn a pound of coal.

Coal has not been in general use more than 100 years.

A locomotive uses one pound of coal for every eight gallons of water.

ENERGY FOR MANY TASKS SUPPLIED BY SINGLE ELECTRIC UNIT

It has been shown by recent tests that one kilowatt-hour of electricity suffices to perform numerous tasks requiring heat and power. By it enough energy can be supplied to drive a sewing machine for 20 hours; clean 15 steel tableknives for a year; clip five horses or 25 sheep, or milk 20 cows. A man could heat his shaving water for a month with its help, or for five years light three cigars a day. In the household it becomes a busy little servant, frying 15 chops in as many minutes, keeping a flatiron hot for three hours, or for 20 mornings warming the curling iron. The dairyman could employ it to chop half a ton of hay, separate 350 gallons of milk, or churn 440 pounds of butter.

EGG INCUBATOR USED TO TEST MILK IN THE MAKING OF CHEESE

Long used to hatch chickens, the incubator now has an important part in cheese making, having been adapted to the testing of milk. As the device supplies an even heat at the required temperature, it may be used in any one of the several curd tests. In addition to being simple and easy to operate, it adds accuracy to the experiments. Already a modified egg incubator has been placed on the market for cheese makers. Instead of trays, it is fitted with racks and glass tubes for the milk samples. Formerly it was a common custom in the industry to hang the specimens in the boiler room, but because of the uneven heat poor results were obtained and often undesirable milk went into the curdling vats.

CLAYS WASHED TO MAKE PORCELAIN

In experimenting with Georgia clays, government experts have devised a new method of washing that has proved successful in the separation of the desirable and undesirable portions. As a result, they are being commercially tested in the manufacture of refractories, floor tile, wall tile, face brick, and electrical porcelains. Other clays also are to be given commercial trials.

TELEPHONING OVER POWER LINES WITH TWO COMPLETE SETS

With two sending and two receiving sets working through single telephone instruments on a power transmission line, both parties may now talk and listen at the same time, as a result of a recent experiment in the middle West. On the lines of a power company a high-frequency automatic telephone system was installed, said to be a long step in advance of anything before attempted with so-called wired wireless. Previous tests made possible only one-way communication.

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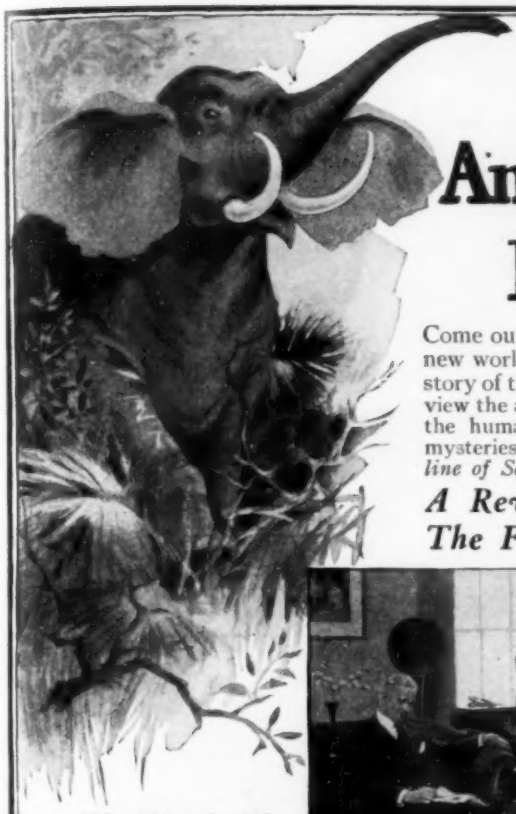

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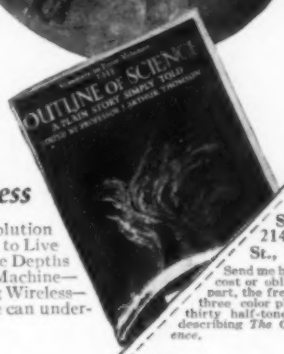

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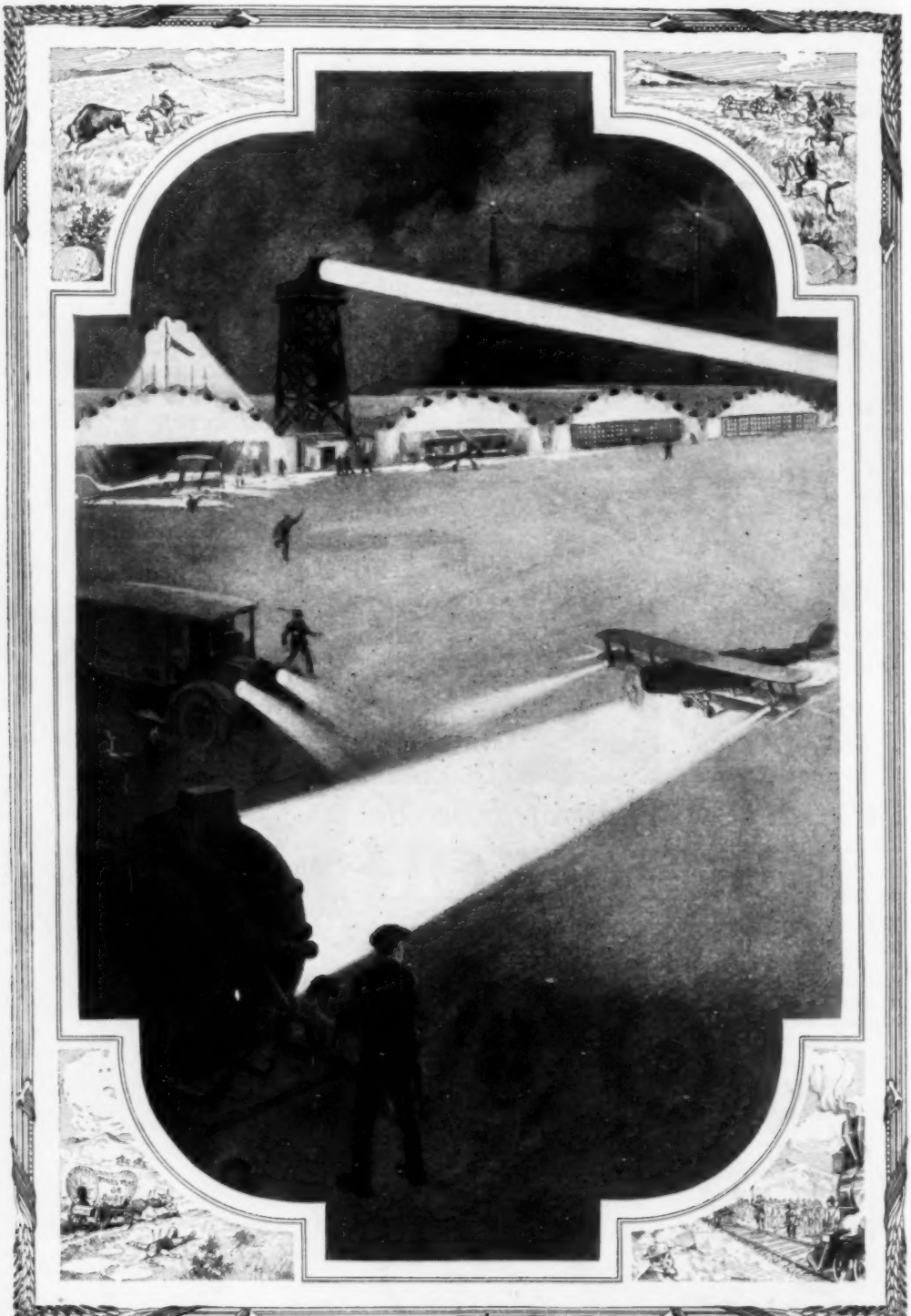

From the Explorers, Goldseekers, Stagecoach, and Pony Express, to the Night Air Mail Flying Down a Pathway of Light to Great Landing Fields